WEB BASED DISEASES PREDICTION SYSTEM

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The project report submitted in partial fulfillment of the requirements for the award of the Bachelor of Computer Science (Software Development)

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DEDICATION

This Web Based Diseases Prediction System are dedicated to my parent Mr. Mohamad Idris Bin Bahauddin and Mrs. Tumiyah Binti Kimin. My deepest dedication also goes to my final year project supervisor, Mr. Muhammad Suhaizan Bin Sulong. Last but not least, I would like to dedicate this system to the entire lecturer of Faculty Information and Communication Technology and my classmate.

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ABSTRACT

Web Based Diseases Prediction System is a system use by patient that is all the organization and doctor. It was developed with the aim of helping the organizational especially for searching the authentic information about diseases and symptoms. With this system, it allows doctor to share the knowledge about symptoms, diseases and suggestions treatment into the system for public references. This system has two parties which is different privilege.

The first parties that is the doctor who is insert the data of symptoms, diseases and treatments, match the data of symptoms with disease, match the data of suggestions treatment with disease and generate report based on patient's data. The doctor can review the report monthly for extra information to reference or give awareness to public to stay health.

The second parties that is patient who is public people that can try the symptom checker to find possible diseases to get further diagnosis. Patient also can find the available doctor which are categorized by name, specialist and location of clinic. Patient can find a doctor to get real diagnosis. Besides patient can view search history of symptoms and diseases for extra information for references. Lastly, patient can read the suggestions treatment for a disease in the system as suggested by doctor.

ABSTRAK

Sistem Ramalan Penyakit Berasaskan Web adalah satu sistem yang digunakan oleh pesakit yang semua organisasi dan doktor. Ia telah dibangunkan dengan tujuan membantu organisasi terutamanya untuk mencari maklumat yang sah tentang penyakit dan gejala. Dengan sistem ini, ia membolehkan doktor untuk berkongsi pengetahuan tentang gejala, penyakit dan rawatan cadangan ke dalam sistem untuk rujukan awam. Sistem ini mempunyai dua pihak yang mempunyai keistimewaan yang berbeza.

Pihak pertama yang merupakan doktor yang memasukkan data gejala, penyakit dan rawatan, memadankan data gejala dengan penyakit, sepadan dengan data cadangan rawatan dengan penyakit dan menghasilkan laporan berdasarkan data pesakit. Doktor boleh menyemak laporan bulanan untuk mendapatkan maklumat tambahan untuk memberi rujukan atau memberikan kesedaran kepada orang ramai supaya tetap berada dalam keadaan kesihatan.

Pihak kedua iaitu pesakit yang merupakan orang awam yang boleh menggunakan pemeriksa gejala untuk mencari penyakit yang bermungkinan dihadapi untuk mendapatkan diagnosis lanjut. Pesakit juga boleh menemui doktor yang ada yang dikategorikan dari segi nama, pakar dan lokasi klinik. Pesakit boleh mencari doktor untuk mendapatkan diagnosis sebenar. Selain itu, pesakit boleh melihat sejarah carian simptom dan sejarah carian penyakit untuk maklumat tambahan untuk rujukan pada masa hadapan. Akhir sekali, pesakit boleh membaca rawatan cadangan untuk penyakit dalam sistem seperti yang dicadangkan oleh doktor.

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INTRODUCTION

1.1 Introduction

In this modern era, it has become the trend of each public in Malaysia to live a busy lifestyle which is a priority in pursuing a career. Most Malaysians are less aware of self-health as too busy with daily life and less practicing on healthy lifestyle. According to (Dr Dzulkefly Ahmad, 2018) from January to June 2018, 32435 cases of dengue fever were recorded throughout Malaysia compared to 49726 cases last year with 110 deaths. According Berita Harian sources, it has been stated that in July 2018 it was shown that dengue fever was diagnosed regardless of age and gender but was more likely to be the level of self-awareness and individual lifestyle. Although recent records are decreases, however, early prevention measures need to be taken by individuals. Many efforts have been undertaken by governments and non-governmental agencies to provide early awareness to the public. In addition, the community needs to be exposed to the information and knowledge of a growing chronic diseases in Malaysia, starting from everyone identified early symptom that can impact an individual's exposure to a disease.

Thus, a system known as Web Based Diseases Prediction System has been proposed in order to cope with this matter. This is a web-based, end user online project that allows individual to get information about health problem through the system. Nowadays, what might have happened in frequently that an individual needs doctor's help, but the factors of not knowing the right procedure and lack of knowledge in meeting the health specialist are the main reasons why the publics randomly plan on health management, besides the unavailable doctors' issue due to some reasons.

The proposed system contains various of data of symptoms, diseases and treatments. In addition, a doctor can share information of symptoms, diseases and treatments based on experiences and knowledges. In this system, in symptom checker module, individual must choose at least two symptoms based on the list that have been display in the screen. Then, the system will process those symptoms to identify the possible diseases based on symptoms similarity. The system is designed to look like a data mining technique to guess the most accurate possible diseases based on patient's symptoms. If the patient's symptoms do not exactly match any diseases in the database, then the system will show the possible diseases that the patient might have. Also, the system provides the clinic details for individual to contact and get real treatments. Lastly, patients and doctors can view statistic of diseases over the months and patients can view the data of search history that consist of symptoms and diseases for future references.

This system is expected to have a big impact on the country with zero dengue fever. Additionally, this approach can create awareness about the importance of early prevention of disease, whether critical or normal. It is a noble effort to make Malaysia, a healthy and prosperous country in maintaining the emotional, spiritual and physical community.

1.2 Problem statement

The limitation of individual's knowledge is the main problems in this project. Most of individual who is patient will be surfing the internet to get information about symptoms or diseases. But it will take time for individual to find out the authentic information that related to the symptoms and diseases. Besides, a certain individual might have curiosity to know about diseases and condition but do not have relative as a doctor to ask. Additionally, individual do not have time to go to the clinic because too busy with everyday work or individual feel

reluctant to ask the doctor about rare diseases like HIV, scoliosis or sexual diseases. Next, difficulty for the doctor to make an analysis on disease stages due to lack of patient's diseases data. Lastly, difficulty for individual to find list of experts that have experience with a particular condition. Hence, with this system, user can find doctor by name, specialist or state.

1.2 Objective

i. To design a system that identify possible diseases based on symptoms similarity.
ii. To develop a system that recommend treatments based on the highest possibility of disease.
iii. To test and verify the effectiveness and performance of the system.

1.3 Project Scope

The scope of project, to focus on how to help the patients find possible diseases related to the symptoms and the doctor can share knowledges and experiences for public references. The result of project to ensure that Diseases Prediction System can give advantages to publics. This system has three users that consists of Patient, Doctor and Administrator.

1.3.1 User and Modules

1.3.1.1 System User

a) Patient

Patient who wants to do search for diseases prediction is need to login using the username and password. The module functions that the patient can do:

i. Search diseases by choose at least two symptoms in the list of symptoms that system had provided.
ii. Search doctor by specialist, doctor's name or clinic's states.
iii. View search of symptoms and diseases history.
iv. View report of statistic diseases.
v. View suggestion treatments for possible diseases.

b) Doctor

The doctor is allowing to insert all information about symptoms and diseases. Hence, user need to login using the username and password. The module functions that the doctor can do:

i. Insert symptoms details.
ii. Insert diseases details.
iii. Insert treatments details.
iv. Register workplace (clinic or hospital) and specialist.
v. Produce a report of statistic diseases.

c) Administrator

Administrator can maintain the data in the system such as maintaining data of user consists of doctors and patients.

1.4.1.2 System Modules

a) Register Account, Log in, Recovery Password and Update Profile

This module allows the user to register their own account as patient or doctor. The system will ask the user for the security question before register account. Besides, this module allows the user to access their own account and make perform their task according to their job scope. User need to input their username and password before login to their own individual account that has been register in the system. For example, if the user is identified as patient, user only able to views only the interface for patient. Patient is restricted from having views the administrator and doctor interfaces. Next in this module, if user can't remember password right, user can recover the password by answering to the security questions. Also, user can update the profile information, for example telephone number, email etc.

b) Symptoms, Diseases and Treatment Management

This module is for a doctor insert a new symptom details which is to match with the specific disease. Doctor will insert the symptoms based on knowledge and experience. Besides, the doctor will insert suggestion of treatments details for each disease. Also, the doctor can update those three data which are symptoms, diseases and treatments.

c) Diseases Prediction

This module is patient will choose at least two symptoms from the list in the Diseases Predictions System to get know the possible diseases that patient may have. The system will calculate the probability of symptoms to show the accurate possible diseases for patient. Then, the system will display list of possible disease that match the symptoms that patient selected.

d) Doctor and Clinic Information

In this module, user which is patient can find a doctor by category that are consists of doctor's name, specialist or clinic's states. Besides, the doctor can insert the information of workplace which is hospital or clinic so that patients can come to get further diagnosis or treatments.

e) View Search History of Symptoms and Diseases

This module is for patients to view the search history of symptoms and diseases for future references. User can view the data by months.

f) Report of Statistic Diseases

This module, the doctor can view monthly reports for doctor's references. The report contains percentage of diseases that have in patients. Also, user which is a patient can view this statistic for own knowledges.

1.4 Project Significance

Web Based Diseases Prediction System will be able to reduce the time consuming of patient for searching information on internet and ease them to get instant diagnose. By providing platform which is Web Based Diseases Prediction System for patients to get the information in fastest ways. The doctor will insert all the symptoms, diseases and treatments information into the system for public references. In addition, this system to gain more knowledge and information about symptoms and diseases that people nowadays did not aware. Moreover, the system is developed to suggest specialist or suitable clinic for patient to get further treatment or cure. Also, the doctor will generate the report for the symptoms of disease in efficiently and systematically.

1.5 Expected Output

The project expected output is to build an online Web Based Diseases Prediction System that could give an instant diagnose to user which is patient. User can search by choose the symptoms that have been listed by the system to find out the possible diseases. Besides, Web Based Diseases Prediction System is quick and efficient way to finding information about the diseases or less time consuming. Also, this system helps in suggest to patient which clinic or doctor that is suitable by the category of specialist or by the clinic's states. Hence, user can reduce time searching for doctor specialist on internet instead the system can suggest suitable doctor specialist. If insists, the patient can meet up the doctor for real diagnosis and get treatments based on module find doctor. By using this system, the doctor has ability to produce

a report of statistic that contains diseases that may have in patient. Also, user which is patient can view the search history that consist of symptoms and diseases for future references.

1.6 Conclusion

In conclusion, the main purpose of the system is built to develop a Web Based Diseases Prediction System which is this system will provide user the way to overcome the problems. It is not only facilitating the patient to know the possible diseases in a fast way, but it also gives advantages to the doctor to share the knowledges to publics. This system can be upgraded with more extra functions such as self-diagnosis questions to determine health level of user either the user need to go to the clinic or not or perhaps a mobile application. The next chapter two will be explain on literature review of project and the methodology use to develop the system.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In general, this section will discuss on the review of literature that related to domain of Web Based Diseases Prediction System. The existing application that are stated in the domain that the proposed system will support will cover by the literature. By doing research analysis of the current system, the requirements and design that are needed to do proposed system can be gathered to verify that the system be more efficiently. Also, the project methodology used to guide in structure, planning and process control of developing system information in smoothly and organized (Software Development Methodologies).

In system front, user who is patient wants get help about any health problem from internet as a primary source of sentiment information to guide the patient into perception in knowing about the health problem. But certain information that posting in the internet that share with the whole cyber user is not authentic. Generally, this situation allows the ability to interpret the data with producing some not accurate information on the internet.

2.2 Facts and findings

Actualities and finding are information and research that can get from the web assets, documentation and perception of healing center or facility the executives. Moreover, this section is progressively centered around the current which is ebb and flow framework, proposed arrangement and certainties cover to the methodology strategy in creating Web Based Diseases Prediction System.

2.2.1 Domain

The objective of project is to develop a system for user who is patient to determine health problem to be carried out considering the user and interact with expert system easily and clearly. This project will be used by patient and doctor in public. This Web Based Disease Prediction System will allow patient to choose the symptoms that patient have and view the possible diseases as to get diagnosis with real doctor. This system won't replace a medical visit with doctor to have diagnosis and treatments, but this system will be useful to identify which diseases can correspond to the symptoms' patient have. Besides, doctor will insert all symptoms, diseases and treatments data into the system as the doctor will teach the system like a machine learning which is based in the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention. Machine learning today is not like machine learning of the past. It was born from pattern recognition and the theory that computers can learn without being programmed to perform specific tasks. Besides, from this system doctor can produce statistic of diseases based on user's search records. The data can be used for future references or for public knowledge to give awareness of health.

2.2.2 Current System

In medical practice, doctors often reach a diagnosis of a disease within minutes of encountering a patient, and sometimes before the patient has even reported their symptoms.

Diagnosing disease is a specialized type of problem-solving, which is believed to require little or no analytical reasoning. Instead, it is likely based on the rapid retrieval of similar cases from memory and, as such, has been likened to pattern recognition. The process of determining which disease or condition explains a person's symptoms and signs. It is most often referred to as diagnosis with the medical context being implicit. The information required for diagnosis is typically collected from a history and physical examination of the person seeking medical care. Often, one or more diagnostic procedures, such as diagnostic tests, are also done during the process.

According to (Brédart A, Bouleuc C, Dolbeault S, 2005), a doctor's communication and interpersonal skills encompass the ability to gather information in order to facilitate accurate diagnosis, counsel appropriately, give therapeutic instructions, and establish caring relationships with patients. Thus, doctor can collect data symptoms from patient to tell accurate disease that patient suffering. But doctor is a human that can forget and do not know until when is the doctor lifetime. Thus, if the doctor is no longer in this world all his knowledge that not everyone know will be disappear and cannot be share with anyone. According to (Simon Parkin,2016), there are about 10,000 known human diseases, yet human doctors are only able to recall a fraction of them at any given moment. However, traditional expert systems in medicine and healthcare often utilize a static set of questionnaires that does not intelligently ask pertinent questions. Moreover, many traditional expert systems often utilize only one inference strategy. We argue that these limitations do not make expert system effective and efficient in addressing the issues of health monitoring and diagnosis in healthcare

Besides, this may cause a major problem to the patient. And this might lead to a situation where the patient would sue the doctor for being careless in prescribing the right treatment. It could cause the doctor to pay a large sum of money. And, lastly, manual file keeping is also being a major barrier of the current system. There are still hospitals and clinics that use manual system including the file keeping. Since the files are kept using the clip files or the paper files and are placed on the shelves, it is a problem for someone who wants to do the inserting,

deleting and retrieving data. The files which are kept for a long time might be very tedious to read because the content might become blur or being destroyed by insects. The files might get lost too. This cause problem for keeping old data's

Figure 2.0: Doctor Consulting Patient

a) e-Health System

Barely in use before 1999, eHealth (also written e-health) is a relatively recent healthcare practice supported by electronic processes and communication. The benefits of eHealth, such as improved operational efficiency, higher quality of care, and positive return on investments. One of the missions of eHealth is to growth the effectiveness in health care, thereby reduce the costs that would be by avoid the unnecessary diagnosis or therapy, through increase communication possibilities between health care establishments and through patient involvement. Besides, in enhancing the quality of care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers. eHealth system can empowerment of consumers and patients that by making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, that eHealth opens new avenues for patient-centered medicine and enables evidence-based patient choice. In addition, to make encouragement of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner and this system enabling information exchange and communication in a

standardized way between health care establishments. According to (Nuq and Aubert) define eHealth as the use of information in electronic format and communication technologies in the health domain. The term e-Health is thus a broad term that refers to everything that applies to the combination of computing or electronic devices and healthcare or medicine.

According to (Journal of Medical Internet), an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology. According to (World Health Organization), the definition to eHealth is the cost-effective and secure use of information and communication technologies in support of the health and health-related fields including healthcare, health surveillance and health education, knowledge and research. According to (European Commission), opinion to eHealth is the use of modern information and communication technologies to meet needs of citizens, patients, healthcare professionals, healthcare providers, as well as policy makers. eHealth can be a promising vehicle for health care provision. International and national health organizations should focus more on the improvement of e-health technology to make it adapted for the benefits of patients. Hence, new and upgrade eHealth technologies have wide potential to bridge the gaps between patient and healthcare support providers. Incorporating technology into the medical care can ensure patient-centered health care system. eHealth is an umbrella term that combines healthcare and technology to support patients in a more efficient way, and it can also reduce health-related costs. Some developed countries who have been implementing health-related interventions, always consider eHealth to be of top priority.

b) Existing Online Symptom Checkers

The public are increasingly using the internet to research about health concerns. While there is a wealth of online resources to learn about specific conditions, self-diagnosis usually starts with search engines like Google or Mozilla. However, internet search engines can lead individual to confusing and sometimes unsubstantiated information, and individual with urgent symptoms may not be directed to seek emergent care. Recently there has been more sophisticated website on internet that called online symptom checkers that attempt efficiently provide a potential diagnosis for patients and direct them to the appropriate care setting. With using the process of algorithms, the online symptom checker will ask patient a few questions that related to the symptom's patient have or require patient to input details of the symptoms. The algorithms are differed and may use logic method or other method. For instance, private companies and other organizations such as the Mayo Clinic, the Symptomate, the National Health Service and the Health Direct have launched features symptom checkers for each website. Typically, the symptom checkers feature is accessed through the website, but some are also available as apps for smart phones. The symptom checkers feature very helpful for patient with non-emergent problem that does not require a medical visit because this feature can reassure the individual and recommend self-care techniques to avoid unnecessary hospital or clinic visits and get treatments at home. When reduce the number of visits will save individual's time and money. But, if patient has critical health problem and not told to seek care, the health could worsen. Meanwhile, individual with minor illness told to seek care, just increase unnecessary visits and therefore will increases time and costs for patient and society.

According to Philips North America, 40 percent of Americans are comfortable using websites and apps to check the symptoms and find possible causes. Besides, one in 10 Americans feel that web-based health information had saved patient live. By encouraging patients, young doctors or pharmacists to learn more about symptoms and possible causes, this can help expert person who is doctor share the knowledges and experiences, significantly improving efficiency all around. The symptom checkers feature has both benefits and drawbacks in diagnosis and give advice as it is not always correct. Hence, important to alert that the feature might do the opposite action such as misdiagnosing patients with a life-threatening problem or worsening the illness. Based on the research, there are three free symptoms checkers that have been tested which are

Mayo Clinic (Online website), Isabel Symptom Checker (Online website) and FamilyDoctor.org (Online website).

i. Mayo Clinic

Mayo Clinic is the first and largest integrated, not-for-profit medical group practice in the world. Doctors from every medical specialty work together to care for patients that had joined by common systems and a philosophy that the needs of the patient come first. There are 3,800 physicians and scientists and 50,900 allied health staff work at Mayo, which has campuses in Rochester, Minn.; Jacksonville, Fla.; and Phoenix/Scottsdale, Ariz. Mayo Clinic is a guide for medical practice throughout the world, establish and enlarge in the farm fields near Rochester. It combines a heritage of medical expertise with careful attention to individual patient needs, resulting in a thorough and personal approach to health care. Besides, Mayo Clinic opened its Jacksonville campus in 1986 and uses a team approach to provide medical diagnosis, treatment and surgery. In Arizona, Mayo Clinic serves more than 90,000 patients each year with cohesive, team-based approach. The clinical practice is focused on adult specialty and surgical care in more than 65 medical and surgical disciplines, supported by outstanding programs in medical education and research. Hence, Mayo Clinic Health System that is system that combine the clinics, hospitals and other health care facilities to serve more than 70 communities in Iowa, Minnesota and Wisconsin. This system provides facilities of care to local communities, ranging from primary to highly specialized health care options. Through the power of combination Mayo Clinic Health System provides patients with access to cutting-edge research, technology and resources. By working together and sharing the knowledge and expertise of Mayo Clinic, health care professionals bring Mayo Clinic care to patients. Mayo Clinic Health System is committed to effective population health management and is preparing for the expansion of value-based contracting. Its leaders understood the need to augment their patient information from the transactional view of EMRs (electronic medical records) to a robust population analytics view.

The features in Mayo Clinic Health System are the system provide information on healthy lifestyle, symptoms, diseases, supplements, find available doctor and request an appointment. The highlight feature in Mayo Clinic Health System is the online symptom

checker. The purpose of this feature is to help patients narrow the search along information journey. This function of this feature is allowed patients to choose a variety of factors that related to patient's symptom, in order to help patients, narrow the potential medical conditions related to patient's symptom. This feature does not incorporate all the personal health factors related to patient, individually, that would allow absolute cause to be suggested. With nearly 1.2 million views annually, the feature Mayo Clinic Symptom Checker will offer and display a list of both adult and child symptoms in the system, then triages the patient after selecting the general symptom. The patient is then directed to new pages that will display a specific related factor. The patient can add as many specific symptoms as desired. Finally, a list of possible causes will show up and a comparison of the associated factors are offered. Another special feature about the Mayo Clinic symptom checker is a side bar of when to seek medical care and patient have an option to learn all about the projected injury or illness. Unfortunately, there is not a current mobile or tablet version, meaning the user must have a computer with Internet access to use the tool. But the symptom checker feature seems to only include text in English, not images or videos, which can be exhausting to read through and add confusion.

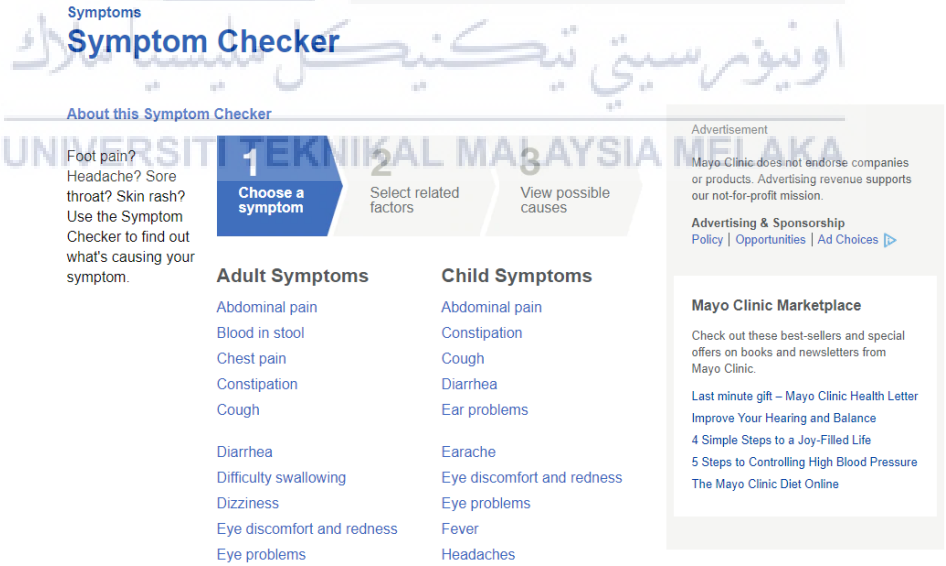


Figure 2.1: Mayo Clinic Symptom Checker

ii. Isabel Symptom Checker

Nowadays, Isabel Healthcare is a global brand that covering professional tools for doctors and a free features symptom checker for public. The development of Isabel Healthcare started out however as a charity. The inspiration behind that charity and the name of company, was a 3 years-old girl. Back in 1999, a girl name Isabel Maude contracted chicken pox. Isabel's family doctor and local hospital assured that there was nothing to be alarmed about, and misdiagnosed Isabel with just a severe case of chicken pox. The chicken pox had developed, however, into the much more serious conditions of necrotizing fasciitis and toxic shock. Despite having to undergo years of reconstructive surgery, Isabel is now a healthy young woman studying at University. Hence, the Isabel Medical Charity set about to develop a pediatric tool that would bring up a list of all the possible diagnoses for an entered set of symptoms. This way no diseases, particularly the rare and more dangerous conditions, could be missed. In 2004, the company Isabel Healthcare was developed, with the Isabel Medical Charity remaining to this day one of the largest shareholders in the company. An adult and pediatric tool was created in 2006. Then, Isabel Healthcare started looking to patients as well as the healthcare professionals. Isabel Healthcare transform the professional Isabel diagnostic tool to be a comprehensive, easy-to-use symptom checker for public, and in 2012 the Isabel Symptom Checker was launched. It was a free symptom checker, and still is to this day, meaning everyone has access to a tool that can help to understand and research individual own symptoms. According to (Gary Mirkin, Allied Pediatrics Chief Executive Officer), by choosing Isabel is very efficient because it is the best diagnosis support tool on the marker and according to (Dr.Joseph Schneider, Baylor Health) had declared as a doctor it is quite some time now used Isabel Healthcare and it is extremely valuable.

The Isabel Symptom Checker, or the one that doctors use is claimed to be much more enlightened than other symptom checkers, as it uses the latest searching technologies and a database of over 6,000 disease in everyday language terms with the same elaborate system used by doctors. Isabel Symptom Checker took 12 years of development and was designed to be used when patients feel unconfident in doctor's diagnosis, or when patients want to make sense of the wide amount of medical knowledge on the Internet with a trusted and accurate source. The Isabel Symptom Checker allows patient to enter an infinite

number of symptoms instead of limiting to a certain amount in addition to the option of entering chronic illnesses or symptoms such as diabetes or high blood pressure. It then decides on the top 10 probable causes and offers web resources for each cause to help patient better understand causes. This symptom checker is built using latest Artificial Intelligence searching technology that allow patients enter symptoms in everyday language. Patients can email, print or save the results and find care within house area. Isabel, however, did have some downfalls. Like Symcat Online Symptom Checker, it is not visual and does not include any visual elements. In addition, Isabel directs users to web resources, such as Wikipedia, that can be filled with an overwhelming amount of information that the patient may or may not wish to look through.

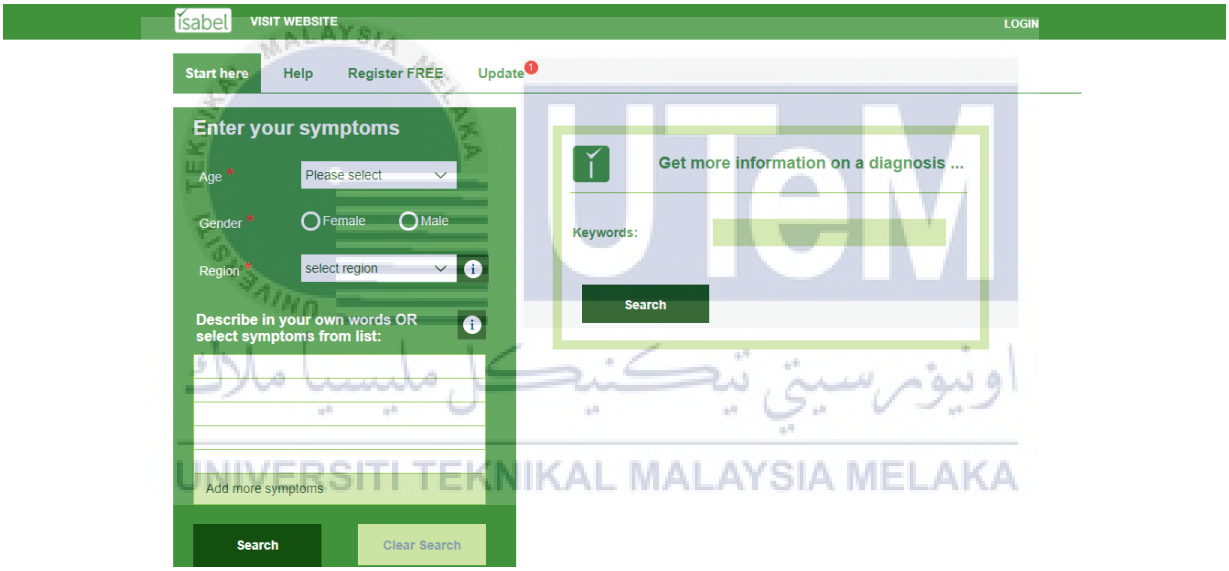


Figure 2.2: Isabel Healthcare Symptom Checker

iii. FamilyDoctor.org

The family doctor term is getting from a doctor who takes care of the whole family. Most types of doctors treat one disease (specialist) or specific field of medicine. Family doctors, though, are trained in all field of medicine. Doctor care for patient through all stages of life, regardless of age or sex. This includes care for patient physical, mental, and emotional health which is Family doctor get to know patients' characters. Where doctor can develop a caring relationship with patient and family. Doctor listen and document patient health history. This helps doctor make the right health care decisions. A family doctor is responsible for diagnosing and treating acute and chronic diseases. Also, family doctor has provided routine health screenings and counseling on lifestyle changes. This helps disallow health issues before doctor develop. If a problem does occur that requires care from a specialist, family doctor will adviser patient and help coordinate all aspects of patient care. Patient and family doctor collaborate to fulfil and reach the best possible outcome in the most cost-effective manner. Family doctors know the most current treatments and technologies. The organization of family doctor was trained for 3 years in real practice settings. This includes treating patients in the office, the hospital, and at home. This allows organization to apply the latest health advancements to the everyday care of patients. Family doctors attach to the highest standards of health care. The American Board of Family Medicine (ABFM) requires family doctors to re-certify every 7 to 10 years and to complete a minimum of 150 hours of continuing medical education every 3 years. In addition, family doctors have the support of a national medical association, the American Academy of Family Physicians (AAFP). The AAFP provides high-quality learning opportunities for family physicians, as well as patient education materials and practice management support.

A health tool developed by the American Academy of Family Physicians is much like the other text-based symptom checkers, but uses flowcharts to allow patient to easily track symptoms and come up with a possible diagnosis. As mentioned previously, it does not include any visual body locator features and is very text-heavy, but for patient who understand flowcharts, it is a very useful tool.

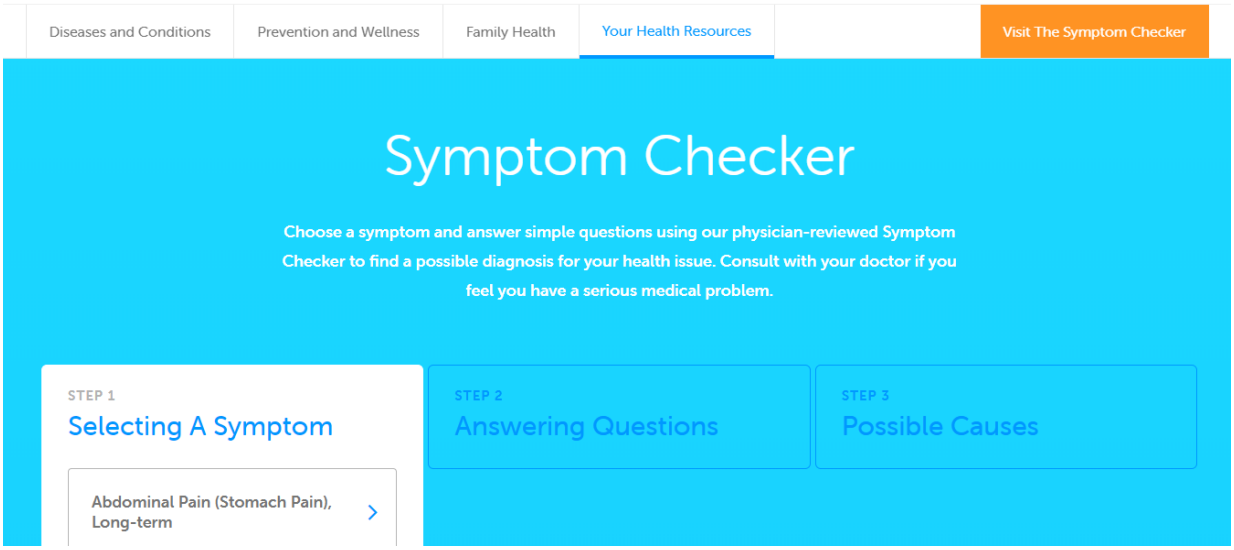


Figure 2.3: FamilyDoctor Symptom Checker

Table below show three current online symptom checker that have been tested. Each of symptom checker features have it's own benefits and drawbacks. Also, the accuracy data of health issue is not same for each symptom checker.

Table 2.0: Existing Online Symptom Checker

System Name	The Accuracy Data
Mayo Clinic	Pharmacy Times reported Mayo Clinic 59% accurate in diagnosis decision and sort advice.
Isabel Healthcare	Pharmacy Times reported Isabel Healthcare 69% accurate in diagnosis decision and sort advice.
FamilyDoctor	Pharmacy Times reported FamilyDoctor.org 56% accurate in diagnosis decision and sort advice.

Online symptom checkers all deployed algorithms, current engineering and technology, and medical knowledge to provide or suggest direction on where to take patient's symptoms. It's safe to conclude that even the best ones aren't always accurate, which is why a visit or call to a primary care physician is the safest bet. Online symptom checkers, however, are a great tool and

pure intention to help guide patients to the right direction, where this feature is not a diagnostic tool and not a replacement for face-to-face consultation. Also, online symptom checker have a good clinical information that will safely direct patients where need to go and user friendly which is assurance that the information patients get from internet is accurate, safe and clinically sound. The most important this online symptom checker is to encourage consumers to take responsibility about health issue and improve health learning.

2.2.3 Propose Solution

a) Machine Learning Method (Modern Expert System)

Because of new computing technologies, machine learning today is not like machine learning of the past. It was born from pattern recognition and the theory that computers can learn without being programmed to perform specific tasks; researchers interested in artificial intelligence wanted to see if computers could learn from data. The iterative aspect of machine learning is important because as models are exposed to new data, they can independently adapt. They learn from previous amputations to produce reliable, repeatable decisions and results. It's a science that's not new – but one that has gained fresh momentum. Machine learning offers a principled approach for developing sophisticated, automatic, and objective algorithms for analysis of high-dimensional and multimodal biomedical data.

Resurging interest in machine learning is due to the same factors that have made data mining and Bayesian analysis more popular than ever. Things like growing volumes and varieties of available data, computational processing that is cheaper and more powerful, and affordable data storage. All these things mean it's possible to quickly and automatically produce models that can analyses bigger, more complex data and deliver faster, more accurate results – even on a very large scale. And by building precise models, an organization has a better chance of identifying profitable opportunities – or avoiding unknown risks.

According to (Paul Sajda,2006), machine learning and statistical pattern recognition have been the subject of tremendous interest in the biomedical community because they offer promise for improving the sensitivity and/or specificity of detection and diagnosis of disease, while at the same time increasing objectivity of the decision-making process.

AI-based app designed to improve doctors' hit rate. The system can analyze "hundreds of millions of combinations of symptoms" in real time and AI diagnosis is less risky than diagnosis by humans. Machines can recall every known disease perfectly when examining symptoms and unlike human doctors, they don't have confirmation bias. According to (Russell, S. and P. Norvig, 2002), artificial Intelligence (AI) is the area of computer science focusing on creating expert machines that can engage on behaviors that humans consider intelligent. The Web Based Diseases Prediction System is for like deal with the problem of diseases diagnosis is an expert system. According to (Beverly G. Hope, Rosewary H. Wild,1994), an expert system is a system that employs human knowledge captured in a computer to solve problems that ordinarily require human expertise. The data and knowledge of Web Based Diseases Prediction System are collected from different sources. The first primary source is the medical knowledge of expert doctors. The second source is from specialized databases, books and a few electronic websites.

Figure 2.4: Artificial Intelligent Application

b) Data Mining Method

Data mining method is most important technique which is used in knowledge discovery in database. Data mining being applied to designed and to assist physicians and other health professionals with decision making tasks, such as determining diagnosis of patient data. Data mining applications in health have intensity potential and functionality. However, the success of healthcare data mining attach on the availability of clean healthcare data. There are four categorization of data mining techniques according to various criteria of classification which are to type of data source mined, to data model drawn, to king of knowledge discovered and to mining techniques used. Data mining intellectual have long studied the application of tools and equipment in enhance the process of data analysis in large and complex datasets. With embrace the data mining techniques in the medicine field is of high importance in diagnosing, predicting and deeply understanding of healthcare data. These applications include treatment centers analysis focus at refine treatment policies and prevention of any mistake in hospitals, early diagnosis of diseases, prevention of diseases and hospital death reduction.

For instance, the heart specialist's record needs to store large amounts of patients' data. This give a great opportunity for extracting a valuable knowledge from such datasets. Researchers are adopting statistical approaches as well as data mining techniques to help treatment and healthcare specialists diagnose and determine heart disease risk factors in patients. Statistical analyses have identified several risk factors for heart diseases including age, blood pressure, smoking, total cholesterol, heart disease background in family, obesity and lack of physical activity. The realization of heart disease risk factors aids treatment and healthcare specialists to identify patients who are subject to high risk factors. Different data mining techniques to help specialists and physicians diagnose any diseases. Some techniques are more common such as Naïve Bayes, decision tree and K-nearest neighbor. However, there are other classification-based data mining techniques such as kernel density, neural network, bagging algorithm, sequential minimal optimization, direct Kernel self organizing map and support vector machine.

2.2.4 Proposed Approach

This project will use the classification of symptoms for each diseases approach, which will identify the high similarity of symptoms in the database to find most accurate the possible diseases that will display in the Web Based Diseases Prediction System for patients.

Before implement the approach, the data of symptoms are important in order need to understand the sickness in patient. These data symptoms could be at the physical level or mental level. In general, those symptoms that have been explained are categorized by body part of patient and be more specific the symptoms categorized into adult or children and by gender. Also, each symptom will set the probability value, to estimate the highest probability of symptoms for each disease on symptom checker feature. The doctor will get the information of symptoms from patient complaints and what the patient feels. All this information of symptoms may be related to the disease that patient have.

According to Hahnemannian method classified the symptoms into two types which are general symptoms that are fever or headache and uncommon symptoms that are coma. Besides, according to Boger's method has classified the symptoms like following manner which are time dimension, causative modalities, tissue affinities and pathological generals. According to (James Tyler Kent) Kent's method was the first to introduce the scheme of analysis, evaluation and gradation of symptoms to reach the similimum. This method has classified the symptoms into three categories such as generals, common and particular. Then these three categories are attributed in both mental and physical symptoms. In addition, each disease has many symptoms and one symptom can be in many diseases such as the patient feels headache and runny nose maybe the patient had disease fever or flu. In order to get the accurate data, the classification of symptoms must be done properly. When the symptoms have classified correctly, the way to find the high similarity of symptoms to display the possible diseases would be more accurate and efficient as well. This approach has getting a rise in precision on symptom checker feature, which has beaten any other approaches. This is a big hope that the project could produce a similar outcome that could

help the patient that feel reluctant to ask the doctor about any illness and for patient, young doctor or pharmacist to learn about new knowledges of diseases

2.2.5 Technique

2.2.5.1 Observation

Carry out the observation on focus user thus, to find out the real matter that facing by doctor and patient. Thus, the matter that had been found, the current online symptom checker still not have the accurate 100% in data diagnosis. Besides, several symptom checker only on apps and the rest on online website. Also, the online symptom checker lack of picture or visual image for patients to refer.

2.2.5.2 Internet Resources

One of the simple ways to get the information on the current system is by internet resource. There are varies information from the article and review in media social and the important things the agreement of public to develop this system.

2.3 Project Methodology

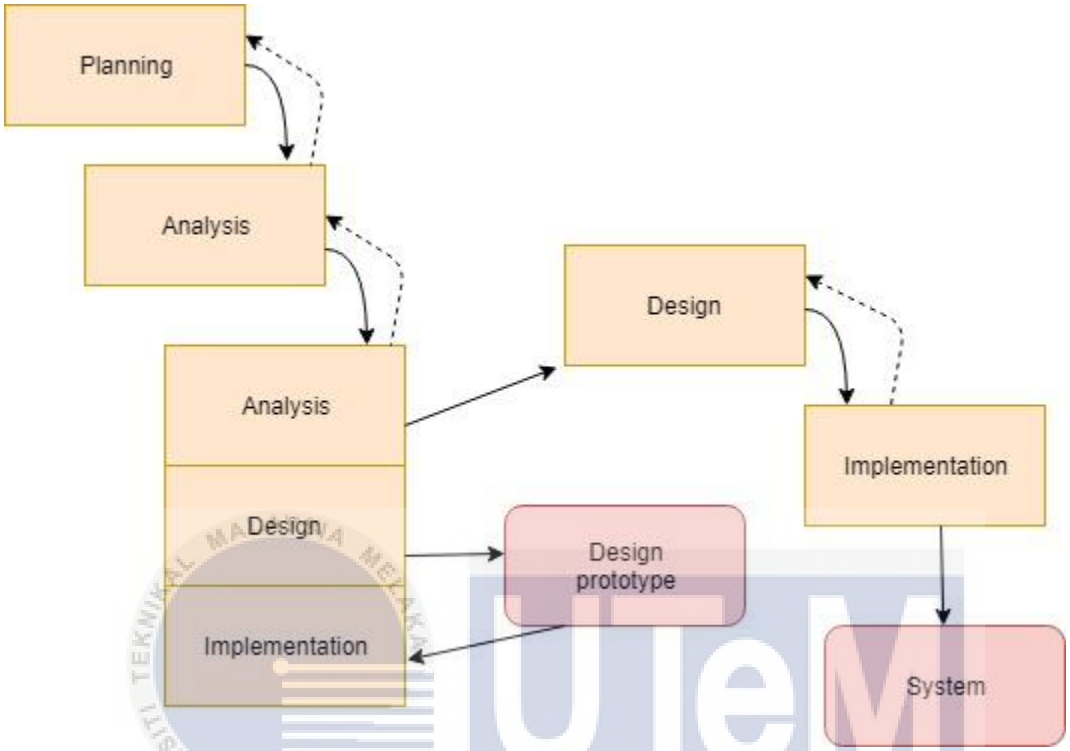


Figure 2.5: Throwaway Prototyping Methodology

The Web Based Diseases Prediction System will be developed according to the throwaway prototyping model. The throwaway prototyping methodologies are done at different stage of SDLC (System Development Life Cycle). The goal of throwaway prototyping is to ensure the system requirements are validated and that they are clearly understood. Throwaway prototyping is chosen because with this model, a small part of the system is developed and then given to the end user to try out and evaluate. The user then will provide feedback which can quickly be incorporated into the development of the main system. Besides, throwaway prototyping is very cost-effective. This model uses series of prototypes to detect and predict possible problems. It can prevent these problems from taking place as soon as the system is introducing to the market. Next, the project completion is quick as the project must be done in 14 weeks. Since it allows early detection of issues, the transition from one step to the next will be smoother and faster.

By using throwaway prototyping, can ease to get better understanding of actual needs of user before the system is developed. This method consists of five (5) main phases. First, the identification of requirements and materials to be used. In this phase, should identify from user the requirements which the basic information so that the project can begin but most requirements are unknown because the process works through "discovery method". The requirements that has been discussed are disease prediction, symptoms disease management, search doctor, view search history and do report on symptom's diseases. Second phase is planning, this phase a meeting with the supervisor has been done. The project title and scope has been discussed then agreed on developing Web Based Diseases Prediction System. During planning, problem statement of existing system is identified, and the importance of this computerized system has been brought up. Gantt chart also has been produced and used as guidelines in performing the task within the estimated project duration before being submitted.

Third phase is implementation, prototyping and verification. Once planning has been completed, implementation of Web Based Disease Prediction System will then take place. In this phase, prototype will be created and introduced to users who will utilize the user for testing and evaluation purposes. At this time, user will be providing feedback, clarify needs and requirements. Fourth phase is prototype enhancements and revisions. During this phase, as requirements of users derived through previous feedback and testing, the prototypes will be continuously altered until such time reached near-perfection. Finally, during finalization phase which is once everything has been set and issues have been properly addresses, the prototype will then be thrown away and the system will be developed, taking feedbacks derived into consideration during the verification process. Hence, by using this throwaway prototyping, model can meet the user's needs because the system has been thoroughly tested using prototypes.

2.4 Project Requirements

This area will express the task necessities of the framework. Programming prerequisites and equipment necessities are including into task necessities. This is explicit stage regarding programming and equipment to create Web Based Diseases Prediction System. This necessity is required for testing the framework upon finishing to guarantee the framework keeps running concurring particular.

2.4.1 Software Requirement

For developing phase, the software requirements that are needed will be listed in table 2.1:

Table 2.1: The List of Software Uses for Developing System

Software	Description
Windows 7	Operating System
Microsoft Word 2010	Documentation and reporting
Microsoft Project 2010	Project Planning and Scheduling
Microsoft Power Point 2010	Presentation
Microsoft Office Visio 2010 / Star UML	Modelling
Notepad++	Platform for develop this system
MySQL, Xampp Web Server	Database and Server

2.4.2 Hardware Requirement

For developing phase, the hardware that are needed will be listed in table 2.1:

Table 2.2: The List of Hardware Uses for Developing System

Hardware	Applicable
Personal Computer	Yes
Hard Disk / External Hard Disk	Yes
RAM	Yes
HP Printer	Yes
Processer	Yes

2.5 Project Schedule and Milestones

Project planning is a piece of undertaking the executives which identifies with the utilization of calendars, for example, Gantt graphs to design and along these lines report advance inside the task condition.

Table 2.3: Milestone for The Entire Project

TASKS	WEEKS														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PLANNING															
Do Proposal of Project															
Find Project Requirement															
Introduction/Executive Summary															
Problem Statement															
Objective, Scope and Significance															
Software and Hardware															
Conclusion															
ANALYSIS															
Identify Current System Problem															
Methodology															
Analysis of Current and Proposed System															
DESIGN															
Database Design															
Module Design															
Design Storyboard															
Design Input and Output of User Interface															
Implementation															
IMPLEMENTATION															
Installing Required Software															

Code User Interface															
Create Database and DDL															
Develop Coding to Create Function															
System Building															
MAINTENANCE															
System Test and Identify Error															
Record Testing Result															
Fix System Error															

2.6 Conclusion

In conclusion, this part had talked about and actualize all the procedure that include in this current undertaking's prototyping model and technique used to finish the task. What's more, all the model that had structure to build up this undertaking and make it work easily. By and large, this section has clarified the entire capacity of the framework and how the framework should function. The following part will examine on examination including investigation of current framework and proposed framework in more subtleties.

CHAPTER III

ANALYSIS

3.1 Introduction

This section will begin with the issue investigation that examines and recognizes the issue experienced with the manual framework that at present use. By this examination, can enhance the past framework by finding the arrangement and connected into Web Based Diseases Prediction System. In this part, will start by introducing the issue examination which will depict the present framework or situation that have been looked by patient or specialist. Henceforth, through this investigation stage designers will be capable make astounding framework. Furthermore, a few figures, for example, action outline ought to be given to demonstrate how the stream of current framework.

3.2 Problem Analysis

Based on research, there is no current system equal to this project. However, there are some manual way that are quite like this Web Based Diseases Prediction System, which is patient meet the doctor for treatments at the clinic or hospital. The point of issue examination is one of the part is to comprehend the issue before begin to build up the framework. There are numerous ways to deal with make the issue examination run effectively.

By study the current system and observation then it will be done the analysis downside. Gather the data from the matter which is get from user observation.

The matter that have been analysis such as patient feeling unwell but not sure need a doctor. Hence, the Web Based Diseases Prediction System can help to find the possible diseases that patient might have. Besides, certain patients are experiencing pain or other symptoms and not sure what that mean and what to do. Patient can find the possible diseases by select at least 2 symptoms on the list of symptoms that will display in the system.

Also, majority user did not aware about the health and lack of knowledge. Thus, the system will help patient understand symptoms or possible sign of diseases, causes and complication. Furthermore, a certain user did not have time go to the clinic because busy with works or living alone and cannot meet the doctor for advice. Therefore, with Web Based Diseases Predication System user can reduce time to find information related to the diseases, symptoms, suggestion treatment and find available doctor for further diagnosis. Also, patient can get suggestion treatments from the possible diseases that had been shown in the system. Moreover, even the system just to find the possible diseases that patient might have, the doctor can produce statistic of diseases over the month for research or references. From the pie chart doctor can give advice for patient awareness. This is because manual system cannot provide an analytical data for the doctor.

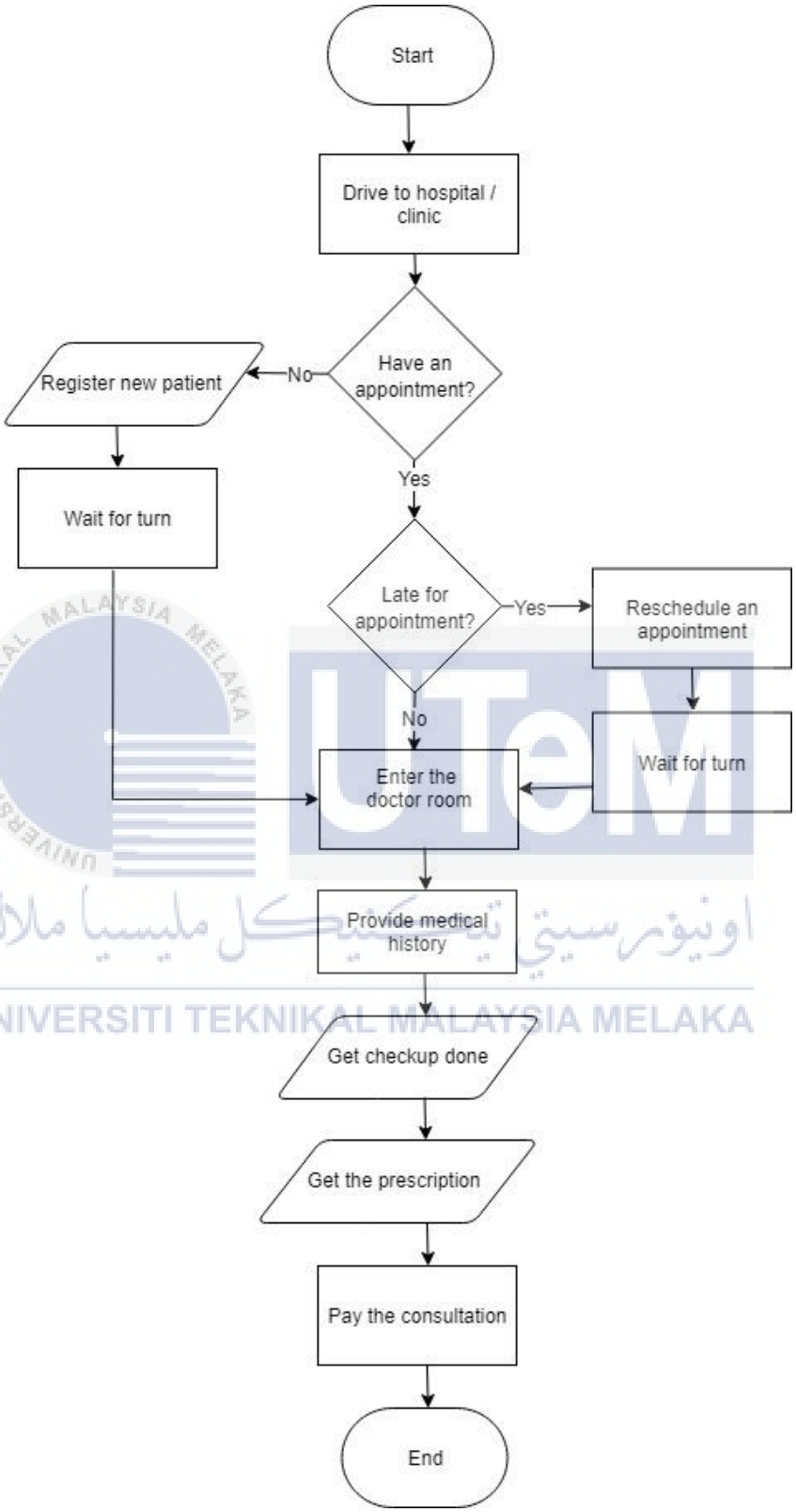


Figure 3.0: Flow Chart of Current System

Figure 3.0 shows the current system flow chart. Patient need to go to the clinic or hospital for treatment. If the patient has an appointment, patient will go straight to the doctor's room. Then patient will do the checkup, get prescription and pay the consultation. If the patient did not have any appointment yet, patient need to register and wait for the turn. Besides, if the patient is late for an appointment and unfortunately missed the appointment, the patient will be rescheduled for next appointment and wait for the turn.

3.3 Requirements Analysis

Prerequisite investigation will portray in term of information necessity, utilitarian necessity, non-practical prerequisite and another prerequisite.

3.3.1 Data Requirement

The information prerequisites required when there is an information accumulation. It is utilized to create the information for a framework. The information prerequisite should be progressively nitty gritty and indicate to concern the meaning of sources of info and yields with the information that put away in the framework. Information prerequisite is a necessity that determines an obligatory information type. These information will be utilized by the framework as an information info and information yield. Moreover, information word reference is utilized to record every one of the information and data about table include in database.

3.3.1.1 Input Data

The table below shows the requirement of data input for Web Based Diseases Prediction System.

Table 3.0: Input Data

Data Name	Data Location	Data Type	Data Description
Username	Login	varchar	Username of user
Password	Login	varchar	Password of user
Date	Symptom checker	date	Date of find possible disease
Disease Name	Add new disease	varchar	Name of disease
Disease Description	Add new disease	varchar	Details of disease
Symptom Name	Add new symptom	varchar	Name of symptom
Symptom Description	Add new symptom	varchar	Details of symptom
Treatment Name	Add new treatment	varchar	Name of treatment
Treatment Description	Add new treatment	varchar	Details of treatment
New Password	Change password	varchar	New password of user
Confirm Password	Change password	varchar	Confirm password of user
Category	Set disease	varchar	Category of disease
Month	Statistic	varchar	Month of statistic
Email	Update profile	varchar	Email of user
Age	Update profile	int	Age of user
Address	Update profile	varchar	Address of clinic
Symptom Checker	Predict disease	varchar	Symptom to predict the possible disease

3.3.1.2 Output Data

The table below shows the requirement of output data for the system.

Table 3.1: Output Data

Data Name	Data Location	Data Type	Data Description
Symptom List	View list of symptoms	List	List of symptoms and the description
Disease List	View list of diseases	List	List of diseases and the description
Treatment List	View list of treatments	List	List of treatments and the description
Statistic	Statistic	Graph	Pie chart that show the number of diseases that patients may have
List of History Diseases	View list of history diseases	List	List of history diseases that have been search
List of History Symptoms	View list of history symptoms	List	List of history symptoms that have been search
List of Available Doctor	View list of available doctors	List	List of available doctors for real diagnosis

3.3.1.3 Internal Data

The tables below show the requirement of internal data for the system.

Table 3.2: Doctor Internal Data

Data Name	Data Description	Data Type & Size
UserNameDoctor	Doctor's username	varchar(30)
FirstName	First name	varchar(50)
LastName	Last name	varchar(50)
Password	Password	varchar(30)
Gender	Gender	varchar(20)
Specialist	Specialist	varchar(30)
ClinicName	Name of clinic	varchar(50)
ClinicAddress	Address of clinic	varchar(50)
ClinicCity	City of clinic	varchar(20)
ClinicState	State of clinic	varchar(20)
ClinicCountry	Country of clinic	varchar(20)
ClinicPhoneNo	Clinic telephone number	varchar(30)
Question1	Security question	varchar(20)
Question2	Security question	varchar(20)
Answer1	Security answer	varchar(50)
Answer2	Security answer	varchar(50)

Table 3.3: Patient Internal Data

Data Name	Data Description	Data Type & Size
UserNamePatient	Patient's username	varchar(30)
FirstName	First name	varchar(50)
LastName	Last name	varchar(50)
Password	Password	varchar(50)
Gender	Gender	varchar(20)
Age	Age	varchar(40)
Email	Email	varchar(50)
Question1	Security question	varchar(20)
Question2	Security question	varchar(20)
Answer1	Security answer	varchar(50)
Answer2	Security answer	varchar(50)

Table 3.4: Symptom Internal Data

Data Name	Data Description	Data Type & Size
SymptomId	Symptom number	int(30)
SymptomName	Symptom name	varchar(50)
SymptomDescription	Symptom description	varchar(70)
SymptomGender	Symptom gender	varchar(20)
CategorySymptomId	Category symptom number	int(30)
BodyPartId	Body part number	int(30)

Table 3.5: Disease Internal Data

Data Name	Data Description	Data Type & Size
DiseaseId	Disease number	int(30)
DiseaseName	Disease name	varchar(50)
DiseaseDescription	Disease description	varchar(70)

Table 3.6: Body_Part Internal Data

Data Name	Data Description	Data Type & Size
BodyPartId	Body part number	int(30)
BodyPartName	Body part name	varchar(50)

Table 3.7: Category_Symptom Internal Data

Data Name	Data Description	Data Type & Size
CategorySymptomId	Category symptom number	int(30)
CategorySymptomName	Category symptom name	varchar(50)

Table 3.8: Patient_Symptom Internal Data

Data Name	Data Description	Data Type & Size
UserNamePatient	Patient's username	varchar(30)
SymptomId	Symptom number	varchar(30)
InDate	Current date the data insert	date
DiseaseId	Disease number	int(30)

Table 3.9: Disease_Symptom Internal Data

Data Name	Data Description	Data Type & Size
DiseaseId	Disease number	int(30)
SymptomId	Symptom number	varchar(30)
Probability	Scoring for data	double

Table 3.10: Treatment Internal Data

Data Name	Data Description	Data Type & Size
TreatmentId	Treatment number	int(30)
TreatmentName	Treatment name	varchar(50)
TreatmentDesc	Treatment Description	varchar(70)

Table 3.11: Disease_Treatment Internal Data

Data Name	Data Description	Data Type & Size
DiseaseTreatmentId	Disease treatment number	int(30)
DiseaseId	Disease number	int(30)
TreatmentId	Treatment number	int(30)

3.3.2 Functional Requirement

Utilitarian prerequisites are explanations of administrations that a framework ought to give, how the framework ought to respond to specific sources of info and how the framework ought to have acted specifically circumstance. This segment characterizes and portrays the useful necessities of Web Based Diseases Prediction System. Useful prerequisite characterizes the inward functions of the product. The table has three segments. Section 1 alludes to the extraordinary id recognizable proof number for prerequisite. Segment 2 alludes to the name of prerequisite and the last segment alludes to portrayal of necessity.

Table 3.12 Functional Requirement

Functional Requirement Number	Requirement	Description
UCS 1_1	Create Diseases	This system allows doctor to create diseases details. Allows doctor to update diseases details.
UCS 1_2	Create Symptoms	This system allows doctor to create symptoms details. Allows doctor to update symptoms details.
UCS 1_3	Match Disease and Symptoms	Doctor will match disease with the symptoms and the probability of the symptoms.
UCS 1_4	Login, Register, Update Profile, Recovery Password	This system allow user to register account for first time login. Allow user login with username and password. Allow user to update profile details. Allow user to change password.
UCS 1_5	View Statistic	This system allow user to view the statistic of diseases.
UCS 1_6	Symptom Checker	Allow patient to select at least two symptoms to see the possible disease.
UCS 1_7	Find Doctor	This system allow patient to find a doctor for further diagnosis.

UCS 1_8	View History Symptom	Allow patient to see record of history symptoms.
UCS 1_9	View History Disease	Allow patient to see record of history diseases.
UCS 2_1	Create Treatment	This system allows doctor to create treatments details. Allows doctor to update treatments details.
UCS 2_2	Match Disease and Treatments	Doctor will match disease with the suggestion treatments

3.3.2.1 Data Flow Diagram

Maps out the information's flow for the system processes that is called data flow diagram (DFD). It is used the symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

Context Diagram

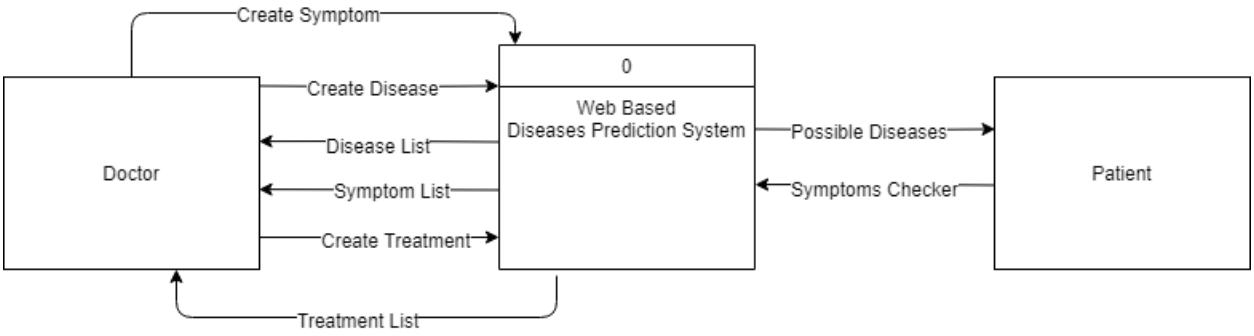


Figure 3.1: Context Diagram

Figure above shows Web Based Diseases Prediction System which is a system for patient to do a symptom checker and a doctor can share knowledge about diseases, symptoms and suggestion treatments. This system has two parties there are doctor and patient. For each party have their own scope or jobs to do. The setting graph is a chart that characterizes the limit between in the framework by demonstrating the elements that interface with it. This setting graph is an abnormal state perspective of a framework.

DFD Level-0

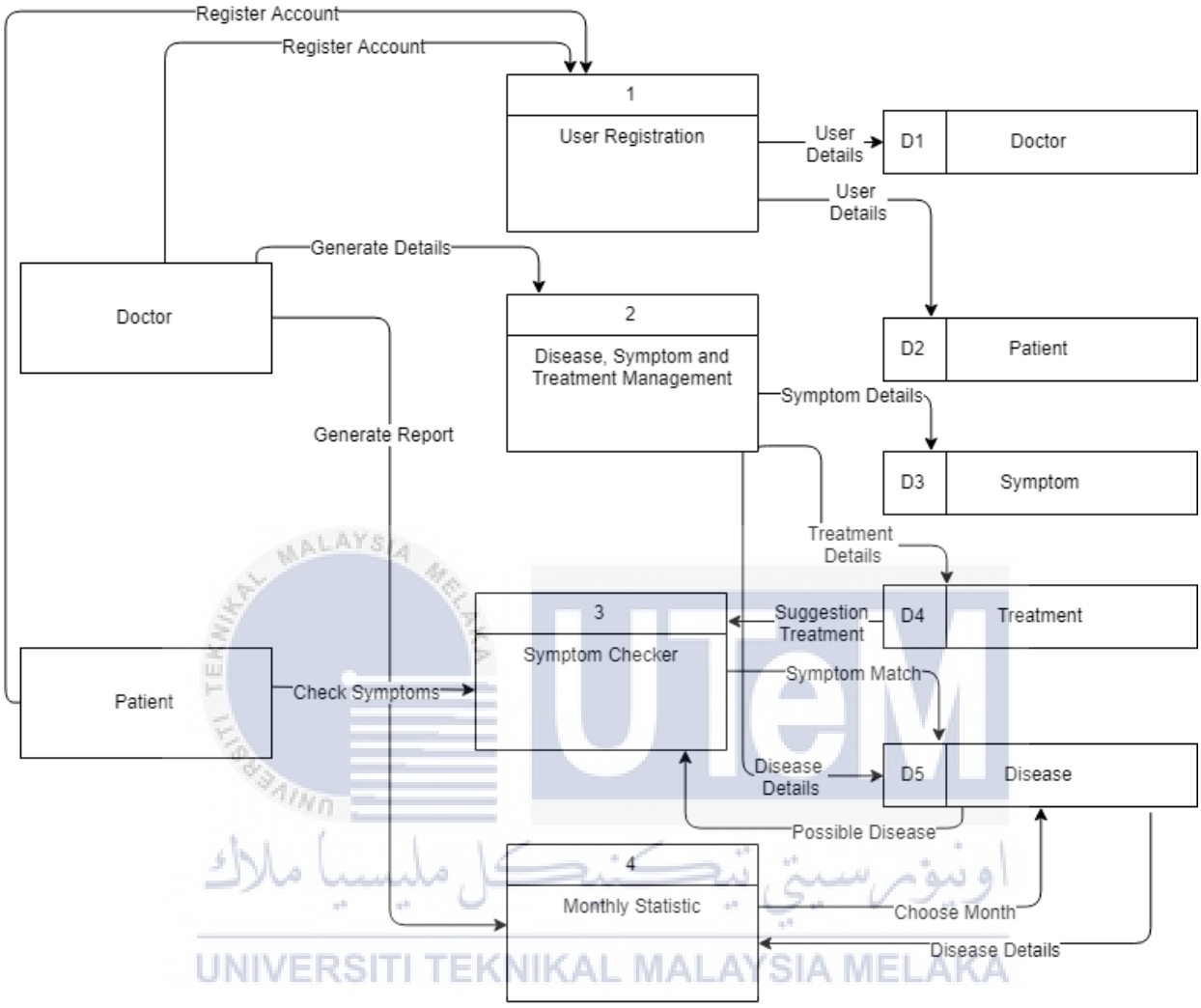


Figure 3.2: Data Flow Diagram Level -0

Data flow diagram (DFD) level 0 shows doctor and patient must register account profile before can login into the system. Besides, doctor can manage the diseases, symptoms and treatments details whereas the data of disease, symptom and treatment will be stored in database. Also, patient can do symptom checker by select at least two symptoms from the list in the system to view possible disease that accurate with the symptoms. Doctor and patient can view pie chart of statistic of diseases which is the data will retrieve from database that from previous patient history.

DFD Level-1

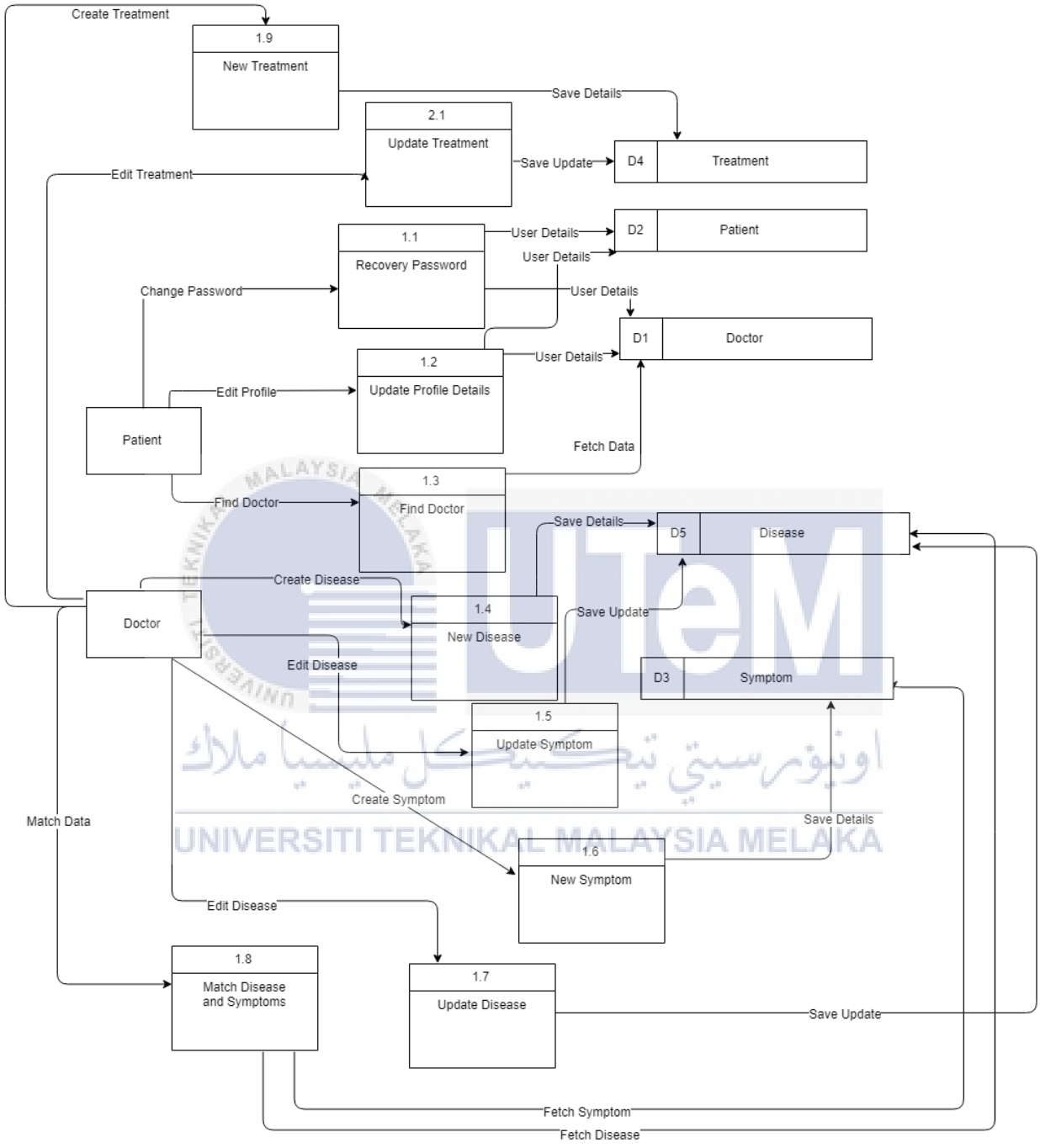


Figure 3.3: Data Flow Diagram Level -1

Data flow diagram (DFD) level-1 is more complex than data flow diagram level 0. Patient can do recovery password and update profile information that will be stored in database of patient and doctor. Besides, doctor will create new disease and update disease details that will retrieve and stored in database. Also, doctor can create new symptom and update symptom details. In addition, doctor can add suggestion treatments and can update the details as well. Meanwhile, doctor can do match the symptoms with a disease for symptom checker module. Moreover, for user which is patient can find available doctor that the system will retrieve data from table doctor and show list of doctors in the system. Lastly, patient can view the history or symptoms and diseases as for future references, that the data can be retrieve from table disease and symptom.

DFD Level-2

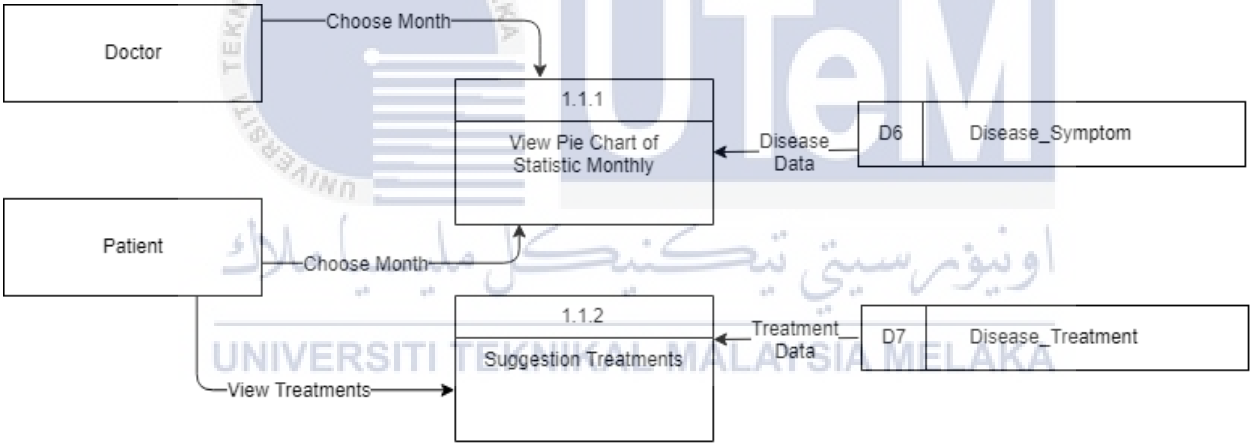


Figure 3.4: Data Flow Diagram Level -2

Two sub-process of Web Based Diseases Prediction System, there are the doctor and patient can view the pie chart of statistic. The pie chart will show the data of diseases that have been suffered by patient from table disease which is in value and percentages. Besides, user can choose month to view the data of statistic. Lastly, patient can view suggestion treatment that have been provided in the system.

3.3.3 Non-Functional Requirement

This area portrays the general non-practical prerequisites for the framework. Non-useful necessity are the requirements on the administrations or capacities offered by the framework and normally applied to the system. Non-functional requirement could be divided into timing constraints and constraints on the development process and standard. There are as follows:

Table 3.13: Non-Functional Requirement

Non-Functional Requirement Number	Requirement	Description
UCS 2_3	Performance	The response of the system should be within 9 seconds
UCS 2_4	Availability	The system run without any error of the functionality
UCS 2_5	Usability	The system shall display the error message upon user mistakes
UCS 2_6	Data Integrity	The data should be 100% consistent and accurate

3.3.4 Others Requirement

There are another three necessities required by Web Based Diseases Prediction System, which are programming prerequisite, equipment necessities, and system prerequisites.

3.3.4.1 Software Requirement

The table shows the details of software requirement used to develop the system.

Table 3.14: Software Requirement

Required Software	Description
Windows 10	Operating System
Microsoft Word 2010	Documentation and reporting
Microsoft Project 2010	Project Planning and Scheduling
Microsoft Power Point 2010	Presentation
Microsoft Office Visio 2010 / Star UML	Modelling
Notepad++	Platform for develop this system
MySQL	Database
PhypMyAdmin	Required as a database to store the data.
Xampp Server	Server that uses to connect the database for the system.

3.3.4.2 Hardware Requirement

The framework requires equipment gadgets to run the create framework. Table underneath demonstrates the itemized equipment necessity that utilized amid the execution.

Table 3.15: Hardware Requirement

Item	Requirement	Minimum Configuration
Vostro 15 5000	Processor	Intel(R) Core™ i5-3210M CPU @ 250GHz 2.50GHz
	RAM	4GB
	System Type	64-bit Operating System

3.3.4.3 Network Requirement

The framework requires a system associated condition. The system association that requirements to utilize is either LAN or WIFI

3.4 Conclusion

In conclusion, this part has clarified the issue subtleties that the present framework confronted, and engineer plan the new stream of the framework activity to enhance the framework. In this part, the module depiction and use case portrayal of the framework had been clarified. Additionally, use case graph, action outline and arrangement chart had been intended to guarantee partner see obviously. The following section will talk about the plan of the entire framework.

CHAPTER IV

DESIGN

4.1 Introduction

The method of process the design, components, modules, interfaces and information for a system to satisfy the required demand is called system design. A system with sensible system style will bring the user to a high level of satisfaction. System design can be divided into 3 types: architectural, logical and physical. Architectural design emphasizes on the structure, behavior, views of that system and analysis; logical design pertains to associate degree abstract illustration of the information flows, inputs and outputs of the system whereas physical design relates to the actual input and outputs processes of the system.

Each of the interface design will explain the input and output of the system. The design of the system is important to help get the overview of the system flow and will be use as one of the baseline requirements for developing the new system. Also, database design included in this phase as it will make sure that every data will be inserting in a correct way. This document is one of the crucial documents because it will give a short-snap overview of the system implementation and its content

4.2 High-Level Design

The design of database and the system architecture will cover up the in high-level design that include the whole system design. Also, it will discuss the relationship within all module and functionality of the framework, data flow, the flow chart of project and project of data structure that including in high level design.

4.2.1 System Architecture

The system architecture of Web Based Diseases Prediction System is shown below. The system architecture is a conceptual model that defines the structure, behavior and view of a system. Also, an architecture description is a description and representation of a system, which is organized in a way that supports reasoning about the structures and behaviors of the system. Client-Server model had to be chosen to be implement as the architecture in the system.

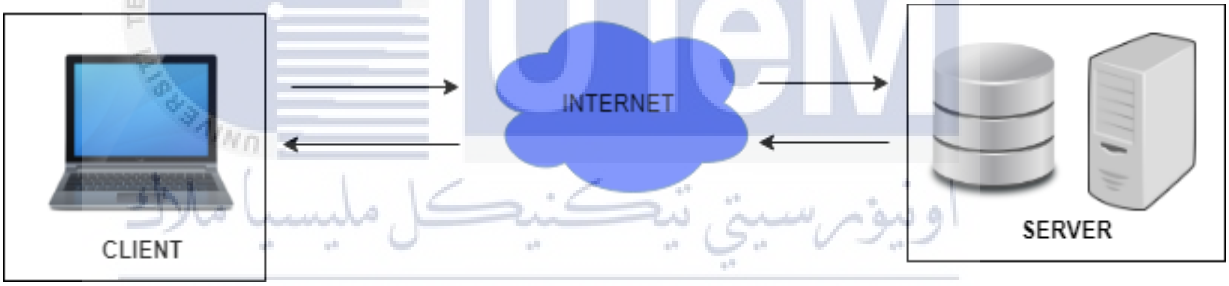


Figure 4.0: Client-Server System Architecture

Figure above shows the system architecture of Web Based Diseases Prediction System. The user of system which is the system that's visiting be designed is net based mostly and involves the client tier. Client tier is connected to web and therefore the web is connected to server and information whereas the chosen information is MySQLi. Thus, three tier architectures had been defined by the system. All the file and database storage are located on the server. Besides, functional process logic, data access, computer data storage and user interface are including in client server architecture which is under three tier architecture. In additional it is separate platforms for independent modules that have been developed and maintains.

4.2.2 User Interface Design

4.2.2.1 Doctor User Interface

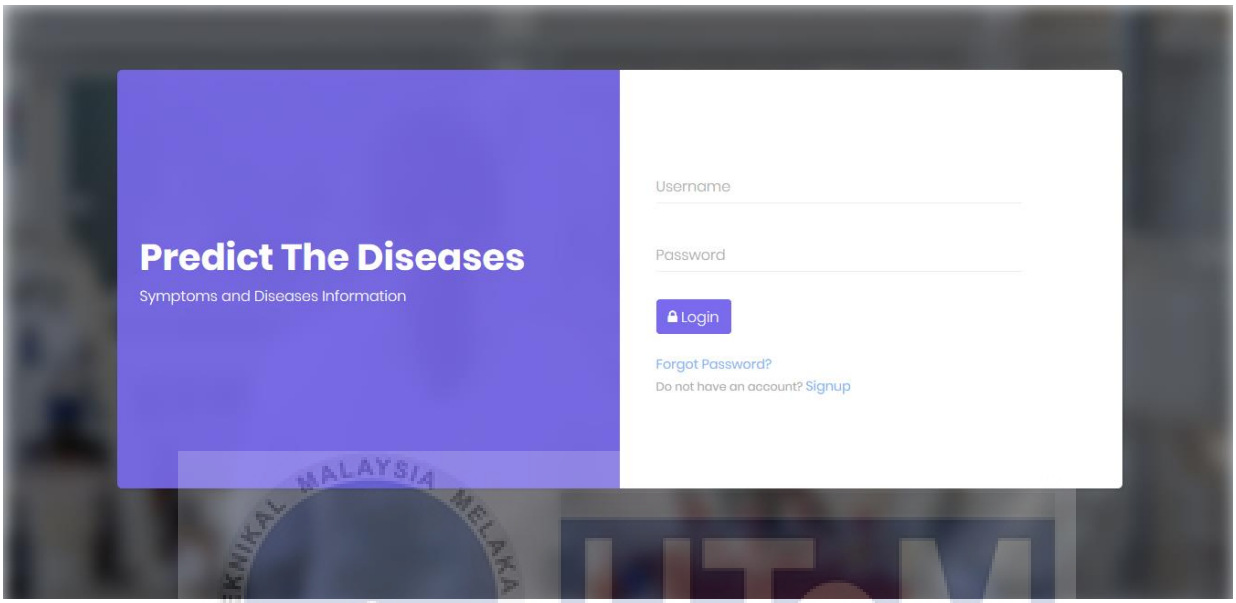


Figure 4.1: Doctor's Login Screen Interface

Figure shows the login screen where the doctor needs to input username and password to access into the system. The system will validate the input username and password. If the input is empty, there is error message will show on the screen to ask user fill in the blank. Also, the system will validate wether the username and password is registered into the database. If data validation true and no exist error system will proceed to next process which is user can log in the system. Also this interface have forgot password for user do recover password and sign up for new user.

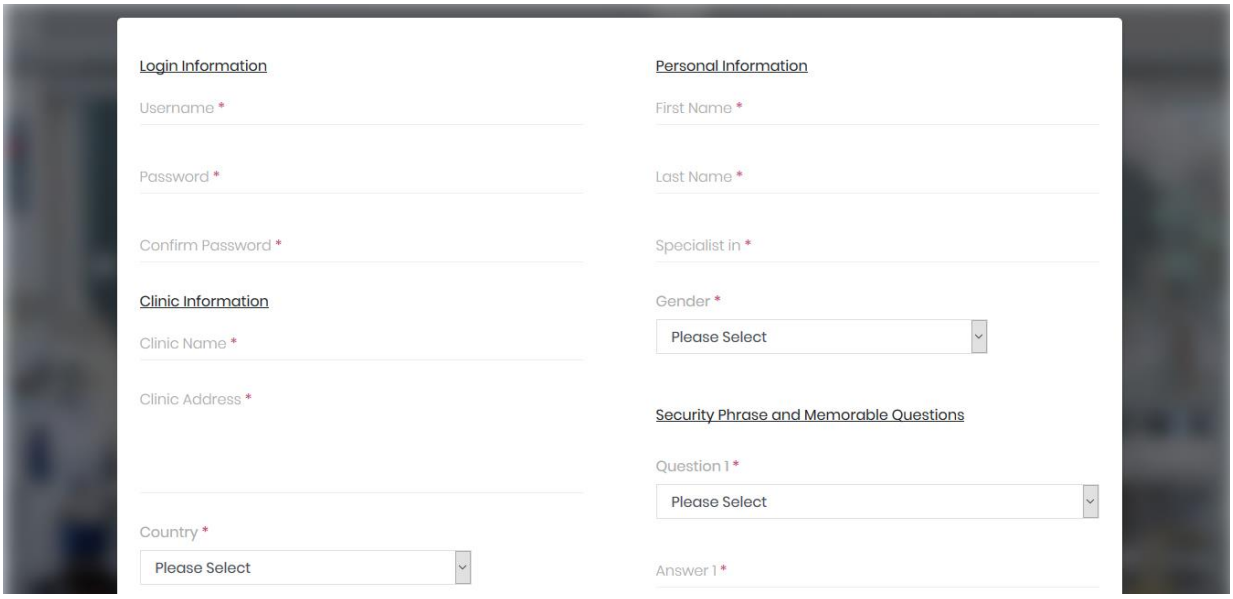


Figure 4.2: Doctor's Registration Screen Interface

Figure 4.2 shows the doctor's account registration screen where user need to fill in all the registration forms which are contain username, password, confirm password, clinic's name, address, country, state, city, clinic's phone number, first name, last name, specialist, gender, security questions and answers. After the registration is successful, the user will be brought to the login screen.

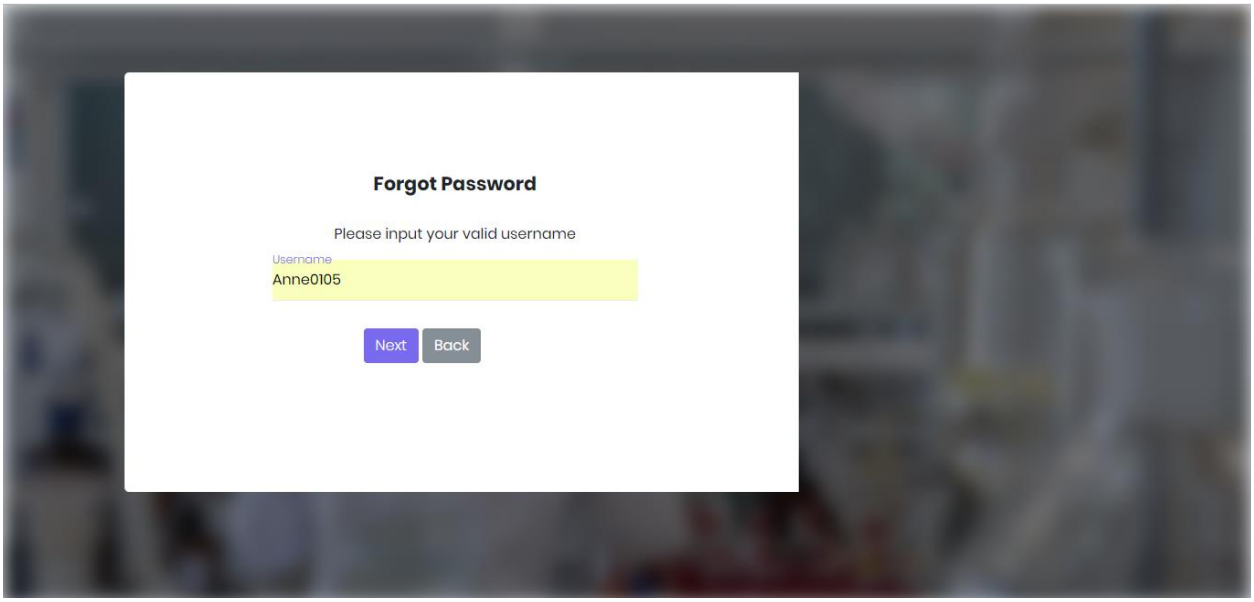


Figure 4.3: Doctor's Recovery Password Screen Interface

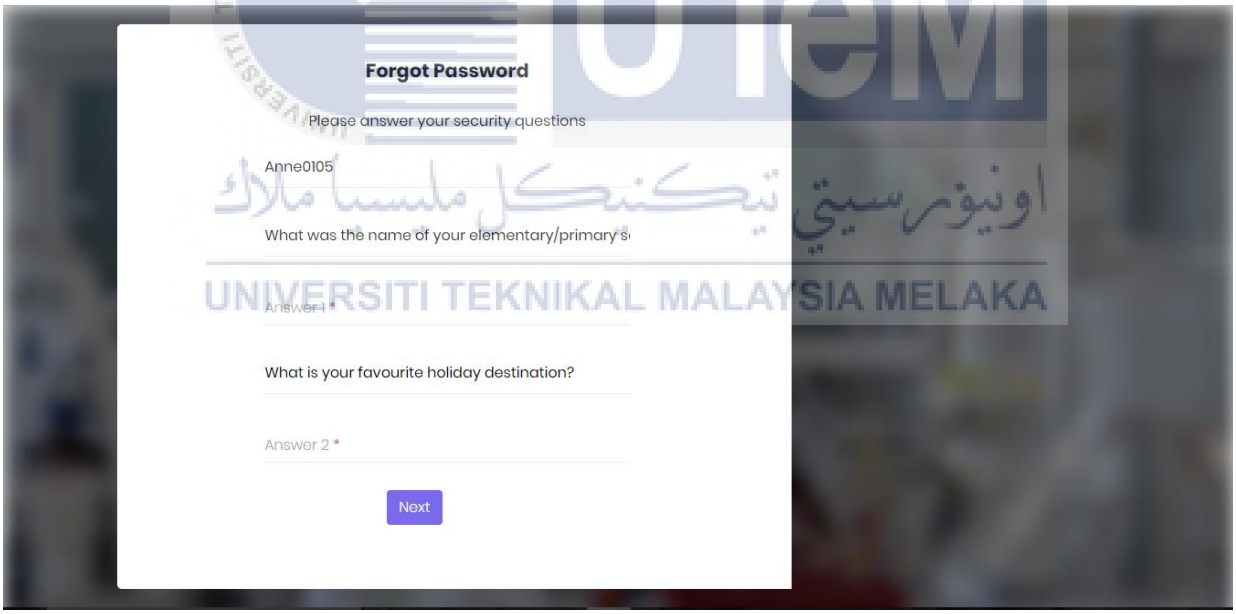


Figure 4.4: Doctor's Recovery Password Screen Interface

Figure 4.3 and figure 4.4 show the interface that when the user pressed button reset password. The user needs to input the username, then the system will process and find in database the security questions that had been choose by the user when the first-time user registered the account. After that, user needs to answer the questions as the answer must be same in the database. The system will validate the answers either correct or wrong. If correct, user can proceed which is user can do reset password by enter the new password and confirm password. If the validation is error user need to do it again.

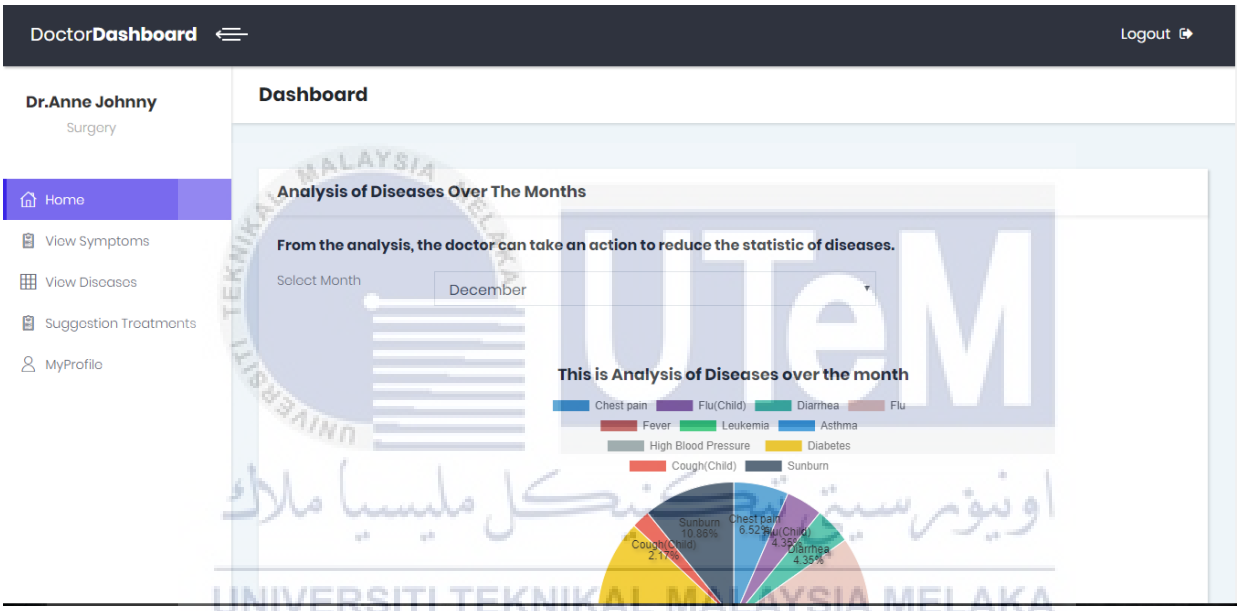


Figure 4.5: Doctor's Home Screen Interface

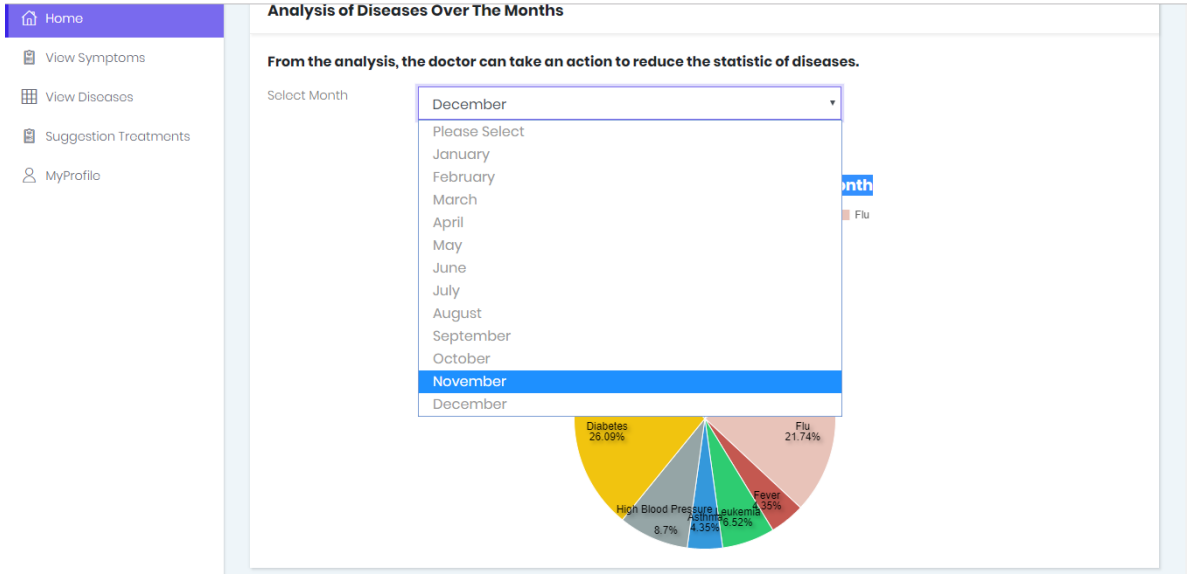


Figure 4.6: Doctor's Home Screen Interface

Figure 4.5 and figure 4.6 show the main page of the doctor's system. Home page will display a pie chart to show the statistic of diseases. The pie chart will shows the data in current month, user have an option to view data in another month by select month from dropdown menu.

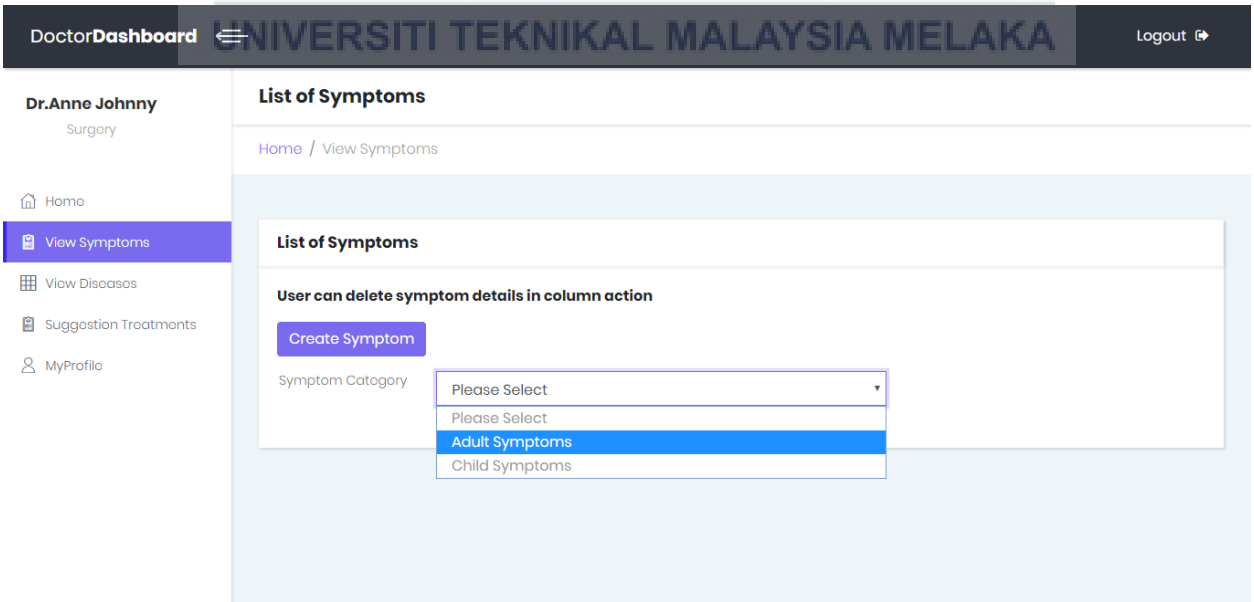


Figure 4.7: View Symptoms Screen Interface

Figure above shows the interface for doctor to view the list of symptoms and button to insert new symptom. First, doctor needs to insert new symptom by click the button and the system will brought to another page to insert the data. Second, if the doctor wants to view list of symptoms, doctor needs to select the symptom category either adult symptom or child symptom.

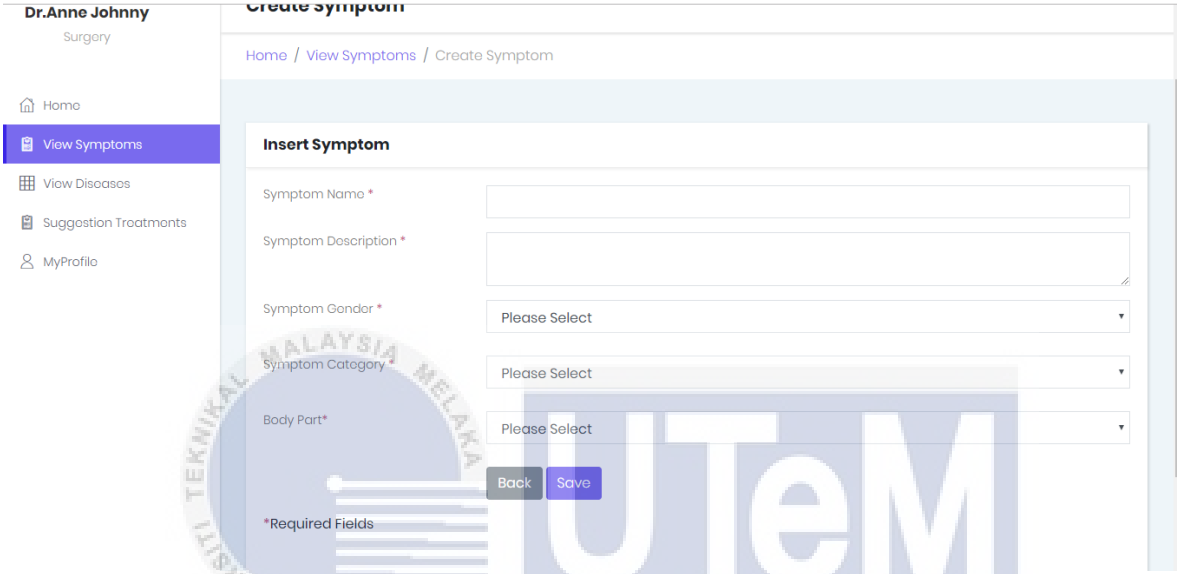


Figure 4.8: Insert New Symptom Screen Interface

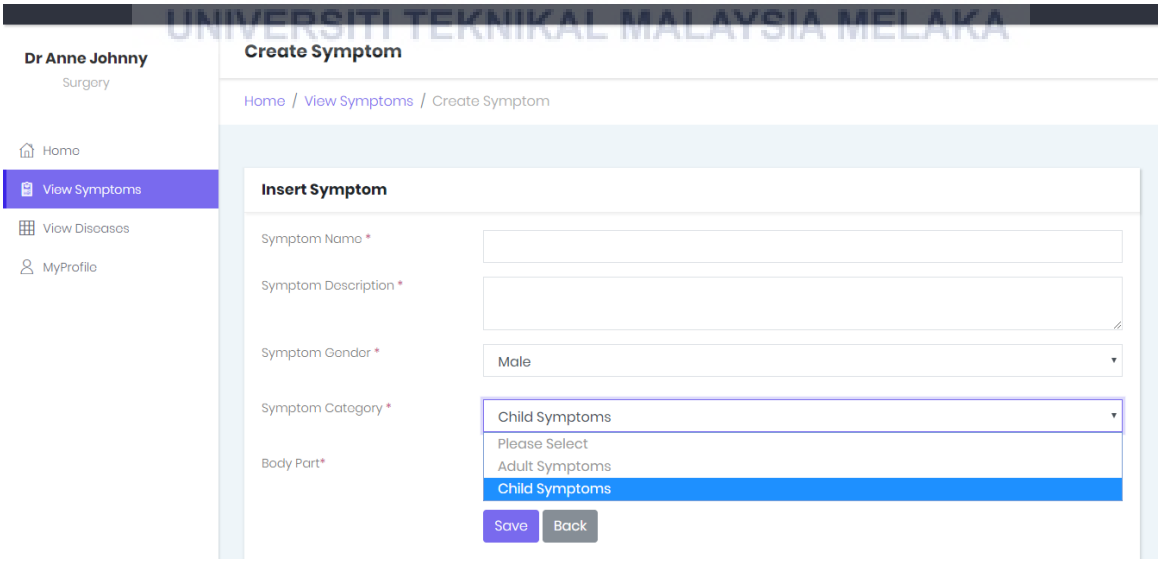


Figure 4.9: Insert New Symptom Screen Interface

Figure 4.8 and figure 4.9 above show the insert new symptom page of the Web Based Disease Prediction System. The doctor must insert symptom name, symptom description to explain about the symptom, symptom category either adult symptom or child symptom and body part of the symptom to be more specific. All the form is required as the doctor need to fill and save.

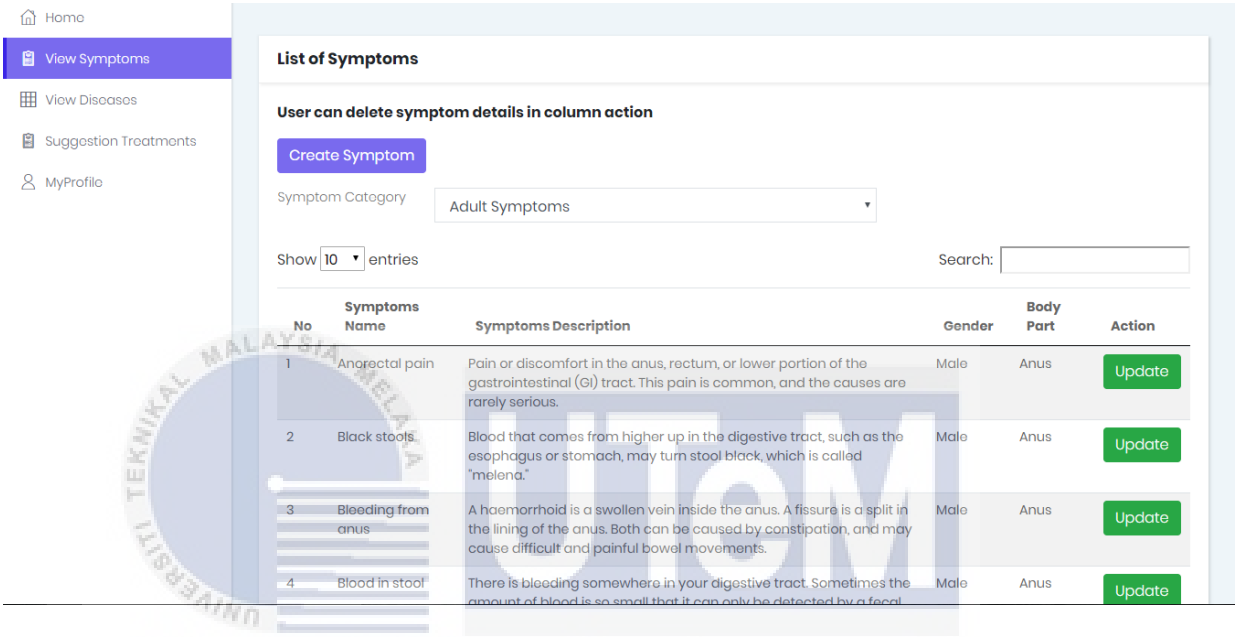


Figure 4.10: View Symptoms Screen Interface

Figure above shows view list of symptoms page. The doctor needs to choose symptom category first before view the list of symptoms. There are two category which, doctor can select either adult symptoms or child symptoms to view the output. Adult symptoms are different from child symptoms. The list of symptoms will be show in a table. The table will show number of lists, symptom name, symptom description, symptom gender, body part and column action which is for update the symptom details.

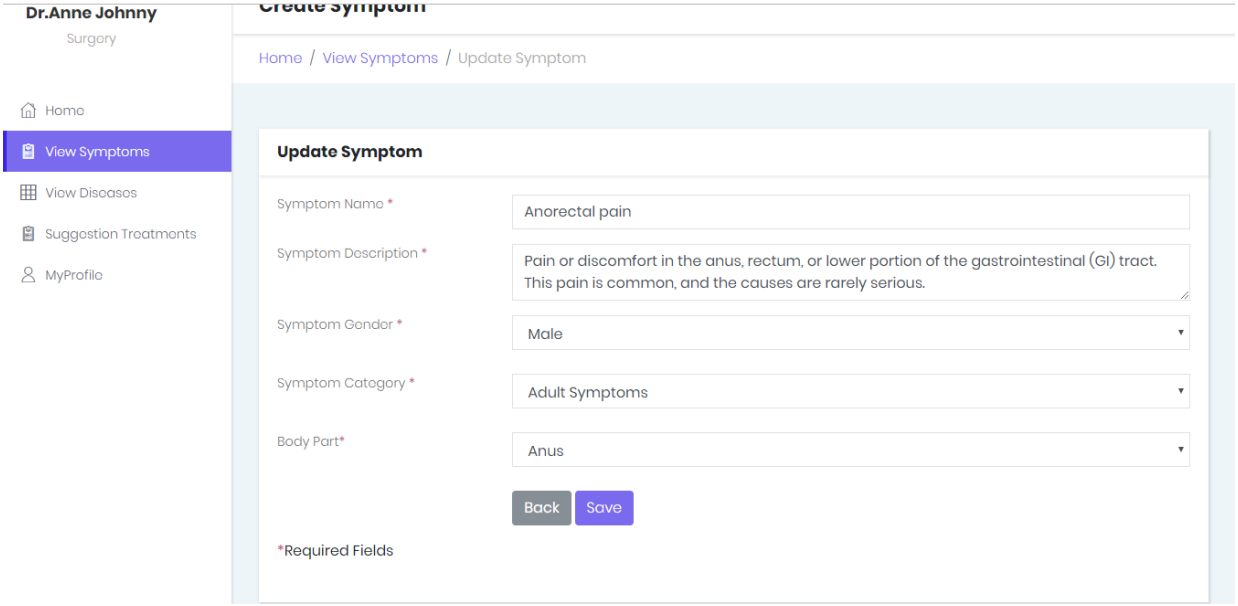


Figure 4.11: Update Symptom Details Screen Interface

Figure above shows that doctor have an option to update the symptom details. Doctor can update the symptom name, symptom description, symptom gender, symptom category or body part. If the action is done, user can click save else user can back to the list of symptoms.

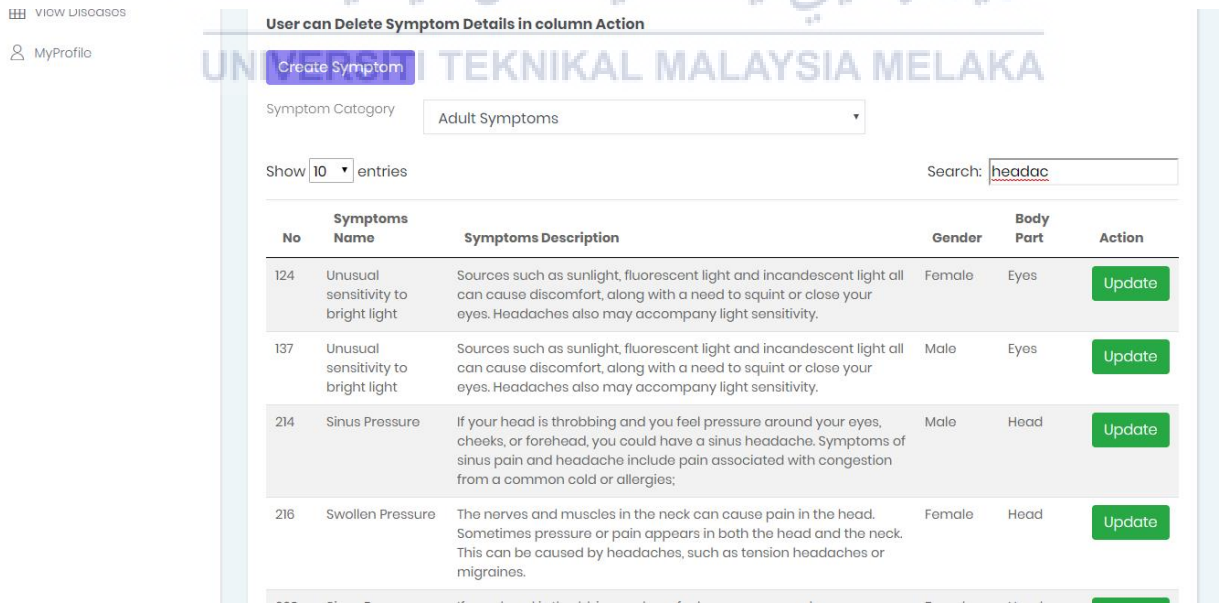


Figure 4.12: Search Symptom Screen Interface

Figure above shows that doctor can do searching in the list of symptom page. The doctor can search the symptom name, body part, symptom gender or symptom descripton for fast searching information.

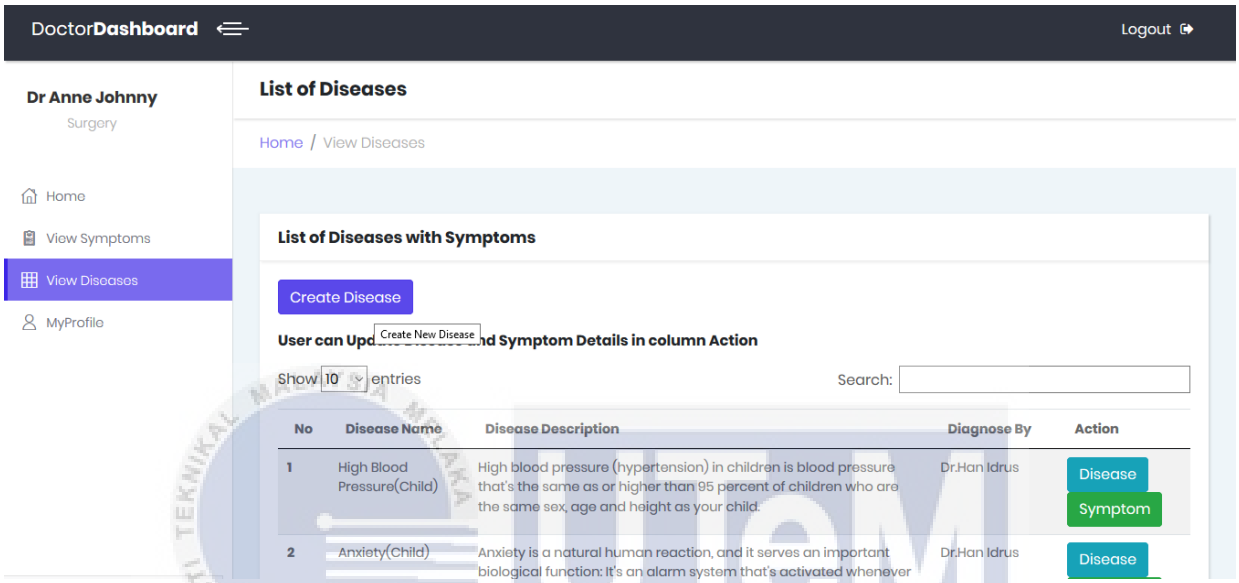


Figure 4.13: View Diseases Screen Interface

Figure above shows the interface of view the list of disease and button to insert new disease. The list of diseases is shown in a table. The table contains number of lists, disease name, disease description, data insert by which doctor and actions column. For the doctor to update the disease details, doctor can click on blue button disease in column action. If the doctor wants to match the symptoms and disease, doctor can click on green button symptom in column action.

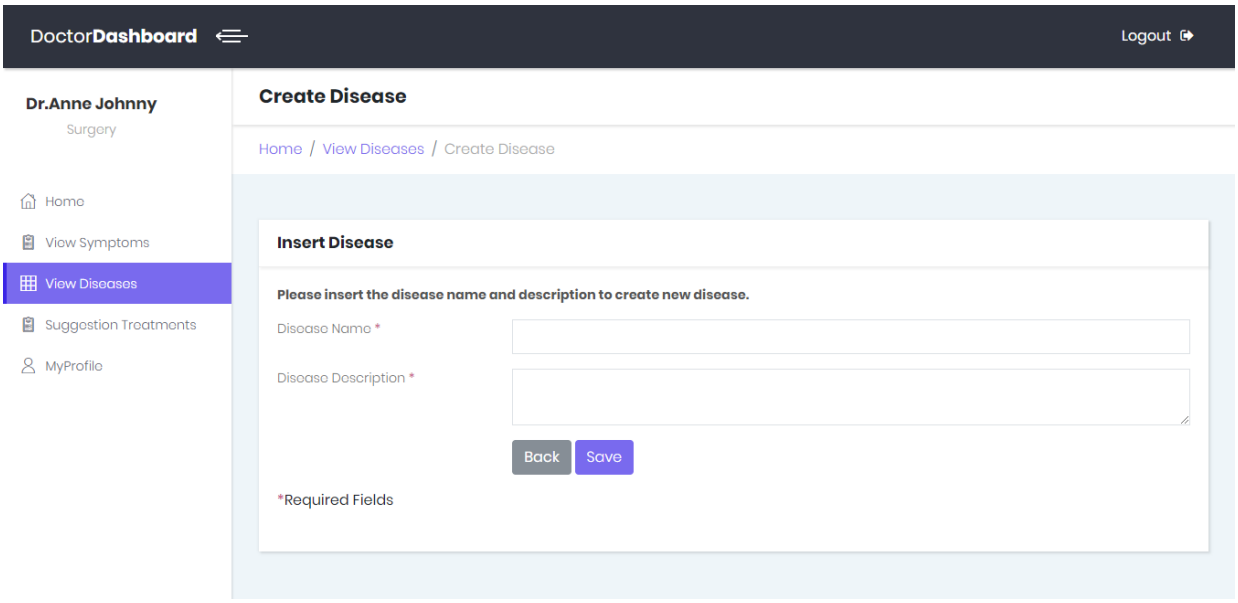


Figure 4.14: Insert New Disease Screen Interface

Figure above shows the page that doctor can insert new details of disease into the database. The doctor must insert disease name and disease description to explain about the disease. All the form is required as the doctor need to fill and save.

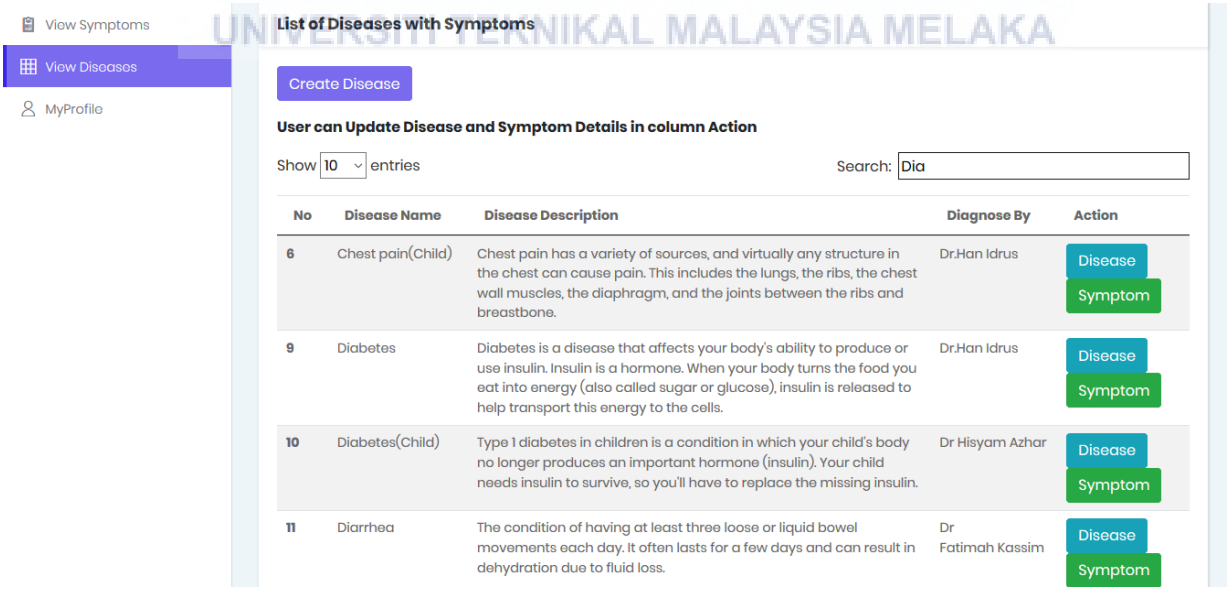


Figure 4.15: Search Disease Screen Interface

Figure above shows that doctor can do searching data from the table list of diseases. The doctor can search the disease name or disease descripton for fast searching information.

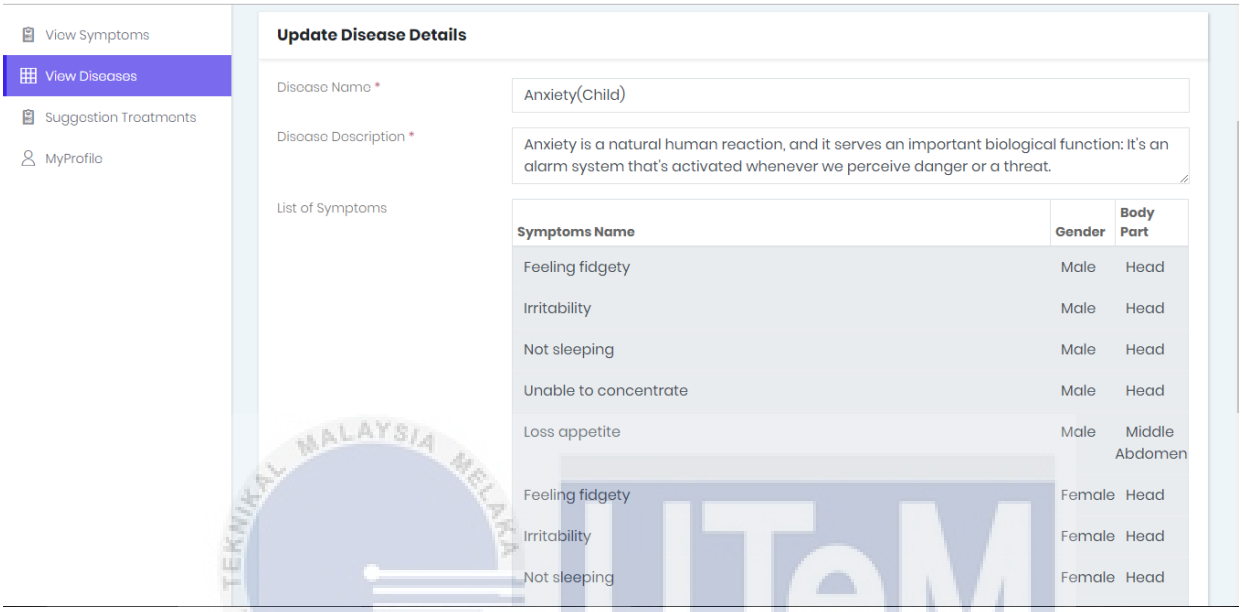


Figure 4.16: Update Disease Details Screen Interface

Figure above shows the interface of update disease details. If the doctor wants to update disease details, doctor can update disease name or disease description. The list of symptoms is read only as references for doctor.

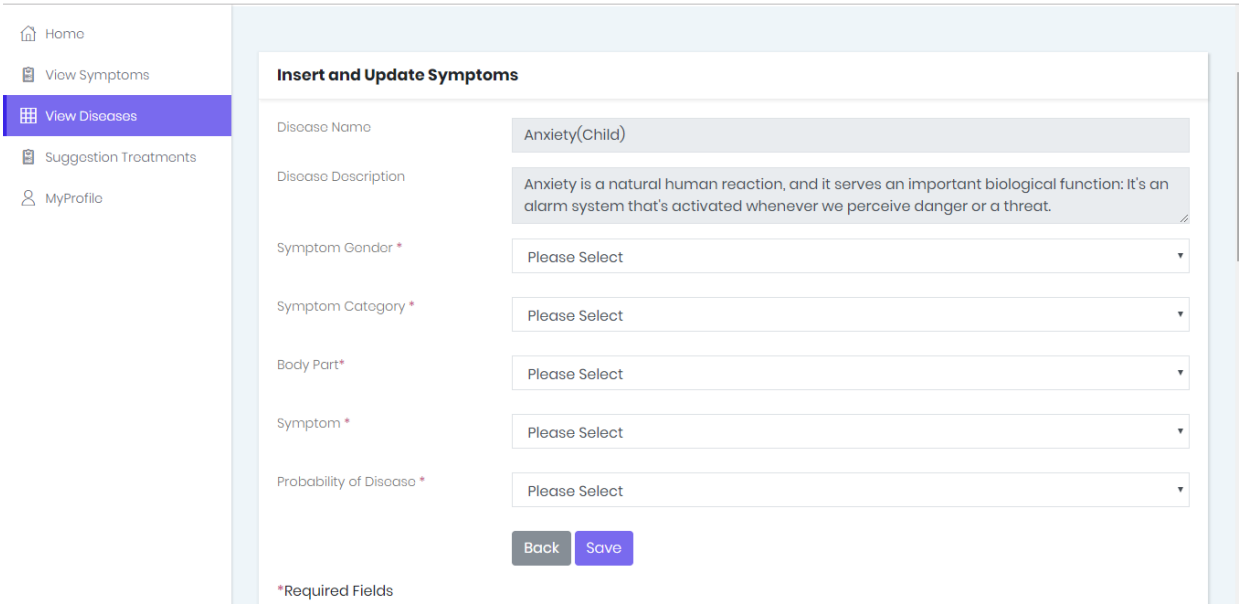
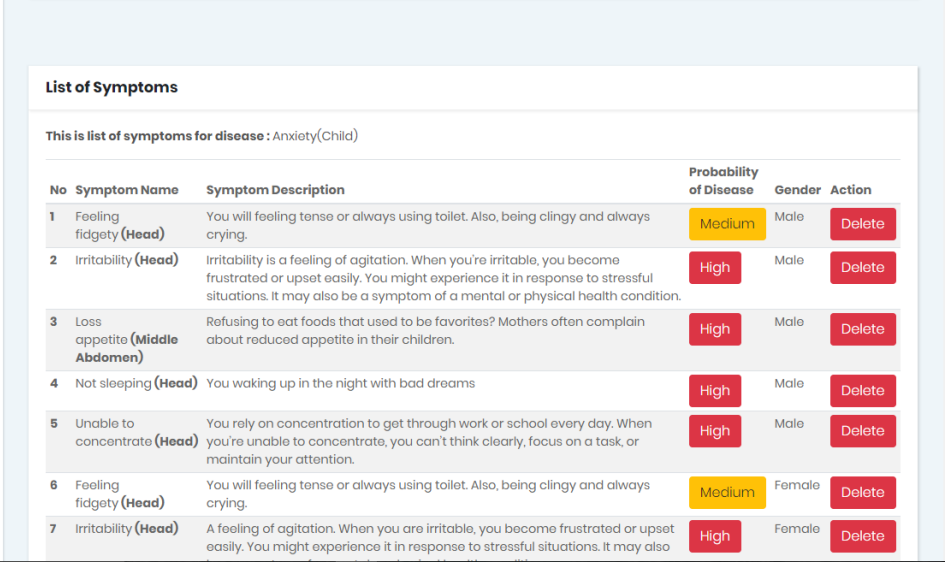


Figure 4.17: Match Disease and Symptoms Screen Interface

Figure 4.17 shows match disease and symptoms page of Web Based Diseases Prediction System. In this interface, the doctor will match the symptoms that are the sign of the disease. Before the doctor can do list of symptoms, doctor needs to choose the symptom category either adult symptom or child symptom. Then, doctor must choose the body part to filter the symptom in more specific. Lastly, the list of symptoms will be shown, and doctor can choose and save. Every symptom has its own probability for each disease. Hence, when patient select the list of symptoms that the display in symptom checker interface, then the system will calculate the sum of probability that the doctor has fixed to determine the possible disease. This is because doctor will insert the data that same symptom with different disease.



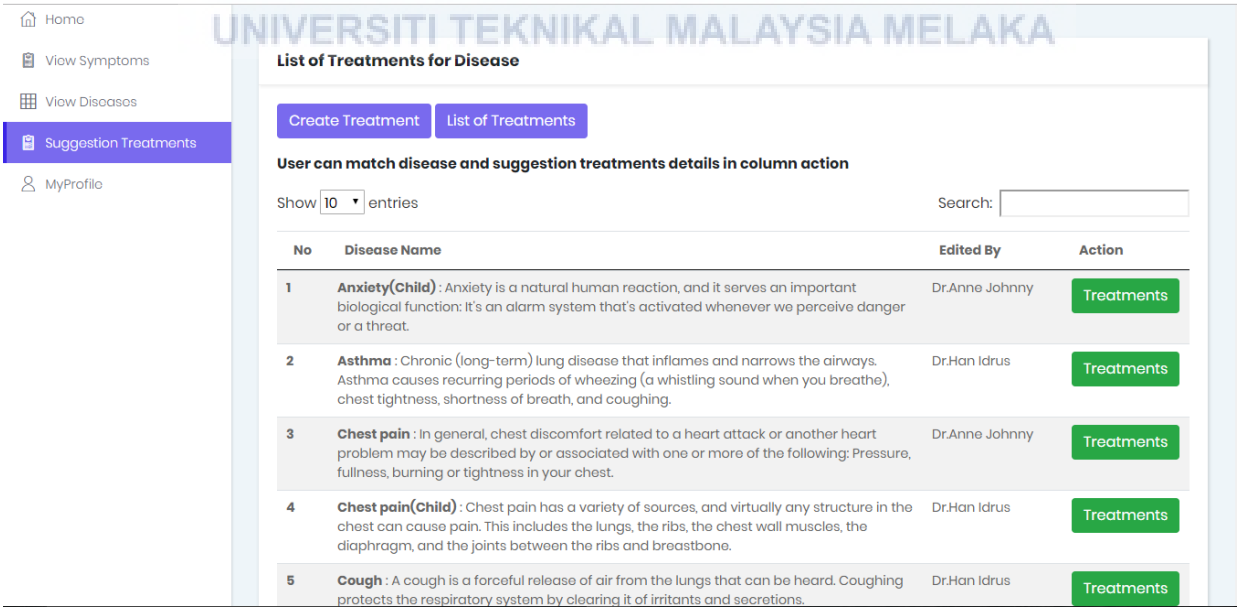
List of Symptoms

This is list of symptoms for disease : Anxiety(Child)

No	Symptom Name	Symptom Description	Probability of Disease	Gender	Action
1	Feeling fidgety (Head)	You will feeling tense or always using toilet. Also, being clingy and always crying.	Medium	Male	Delete
2	Irritability (Head)	Irritability is a feeling of agitation. When you're irritable, you become frustrated or upset easily. You might experience it in response to stressful situations. It may also be a symptom of a mental or physical health condition.	High	Male	Delete
3	Loss appetite (Middle Abdomen)	Refusing to eat foods that used to be favorites? Mothers often complain about reduced appetite in their children.	High	Male	Delete
4	Not sleeping (Head)	You waking up in the night with bad dreams	High	Male	Delete
5	Unable to concentrate (Head)	You rely on concentration to get through work or school every day. When you're unable to concentrate, you can't think clearly, focus on a task, or maintain your attention.	High	Male	Delete
6	Feeling fidgety (Head)	You will feeling tense or always using toilet. Also, being clingy and always crying.	Medium	Female	Delete
7	Irritability (Head)	A feeling of agitation. When you are irritable, you become frustrated or upset easily. You might experience it in response to stressful situations. It may also	High	Female	Delete

Figure 4.18: List of Symptom Screen Interface

Figure above shows the list of symptoms page of Web Based Diseases Prediction System. The list of symptoms will be created when the doctor match the symptoms with the disease. After the doctor insert the symptom, the page will be refresh and the list of symptoms will be shown under the forms. Besides, the doctor has an option to delete the symptom that have been added into the table by clicking red button delete.



Home
View Symptoms
View Diseases
Suggestion Treatments
MyProfile

List of Treatments for Disease

Create Treatment | List of Treatments

User can match disease and suggestion treatments details in column action

Show 10 entries Search:

No	Disease Name	Edited By	Action
1	**Anxiety(Child)** : Anxiety is a natural human reaction, and it serves an important biological function: It's an alarm system that's activated whenever we perceive danger or a threat.	Dr.Anne Johnny	Treatments
2	**Asthma** : Chronic (long-term) lung disease that inflames and narrows the airways. Asthma causes recurring periods of wheezing (a whistling sound when you breathe), chest tightness, shortness of breath, and coughing.	Dr.Han Idrus	Treatments
3	**Chest pain** : In general, chest discomfort related to a heart attack or another heart problem may be described by or associated with one or more of the following: Pressure, fullness, burning or tightness in your chest.	Dr.Anne Johnny	Treatments
4	**Chest pain(Child)** : Chest pain has a variety of sources, and virtually any structure in the chest can cause pain. This includes the lungs, the ribs, the chest wall muscles, the diaphragm, and the joints between the ribs and breastbone.	Dr.Han Idrus	Treatments
5	**Cough** : A cough is a forceful release of air from the lungs that can be heard. Coughing protects the respiratory system by clearing it of irritants and secretions.	Dr.Han Idrus	Treatments

Figure 4.19: View Suggestion Treatment Screen Interface

Figure above shows the treatments details page of Web Based Diseases Prediction System. There are two buttons above the table which, first button create treatment for insert new treatment details and second button list of treatment to view list of treatments. In the table is list of diseases for doctor to match suggestions treatment for each disease. Doctor needs to click green button treatments in column action to match the treatments.

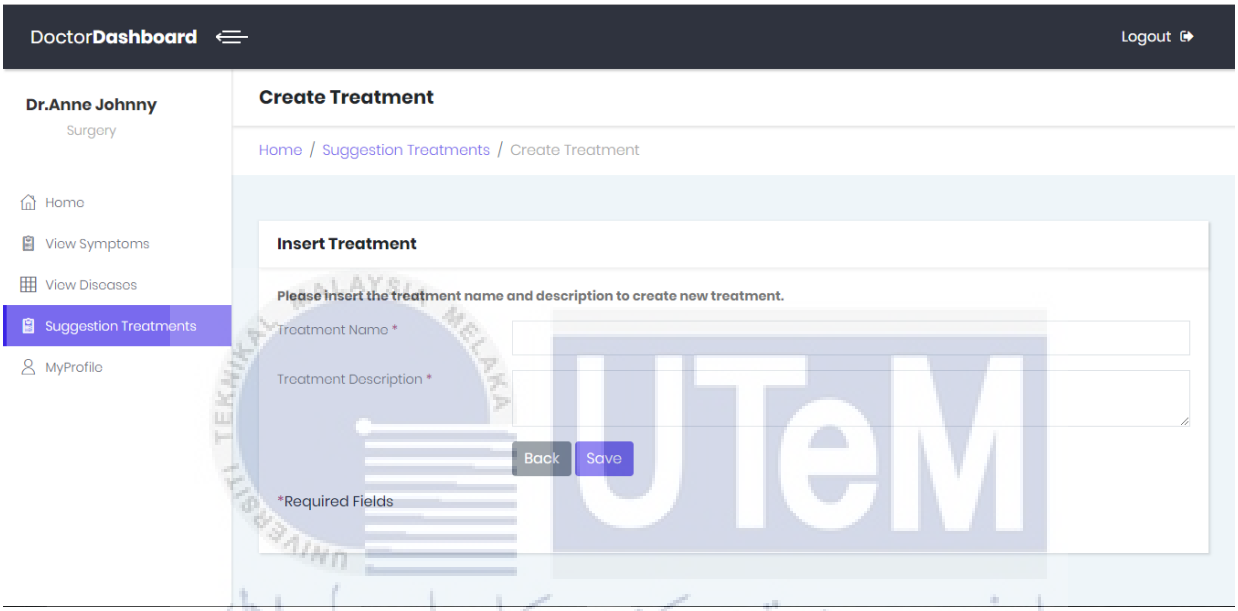


Figure 4.20: Insert New Treatment Screen Interface

In figure 4.20 shows the page that doctor can insert new details of treatment into the database. The doctor must insert treatment name and treatment description to explain about the treatment. All the form is required as the doctor needs to fill in and click button save.

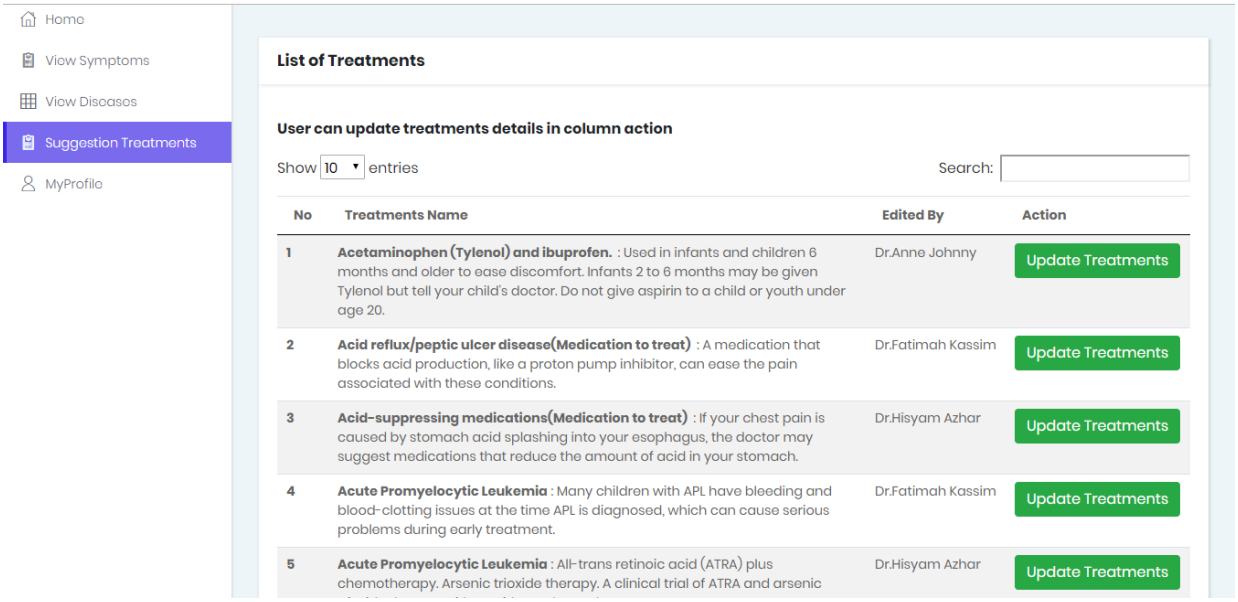


Figure 4.21: List of Treatments Screen Interface

Figure above shows the interface to view the list of treatments. The list of treatments is shown in a table. The table contains number of lists, treatment name, treatment description and actions column. For the doctor to update the treatment details, doctor can click on green button update treatment in column action.

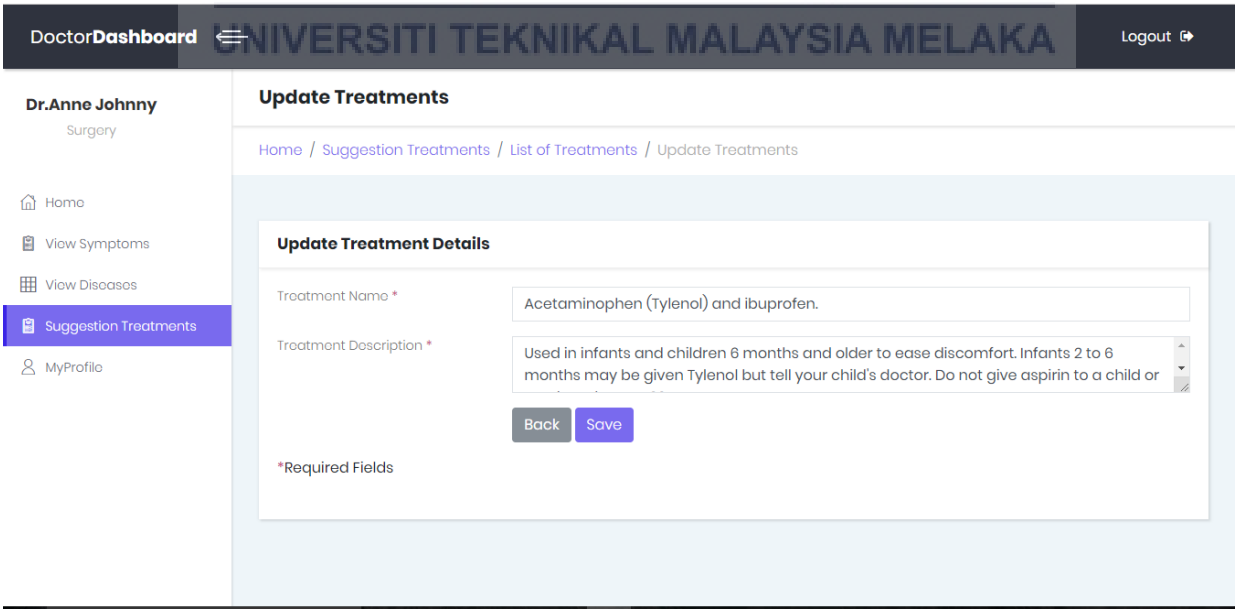


Figure 4.22: Update Treatment Details Screen Interface

Figure above shows the interface of update treatment details. If the doctor wants to update treatment details, doctor can update treatment name and treatment description.

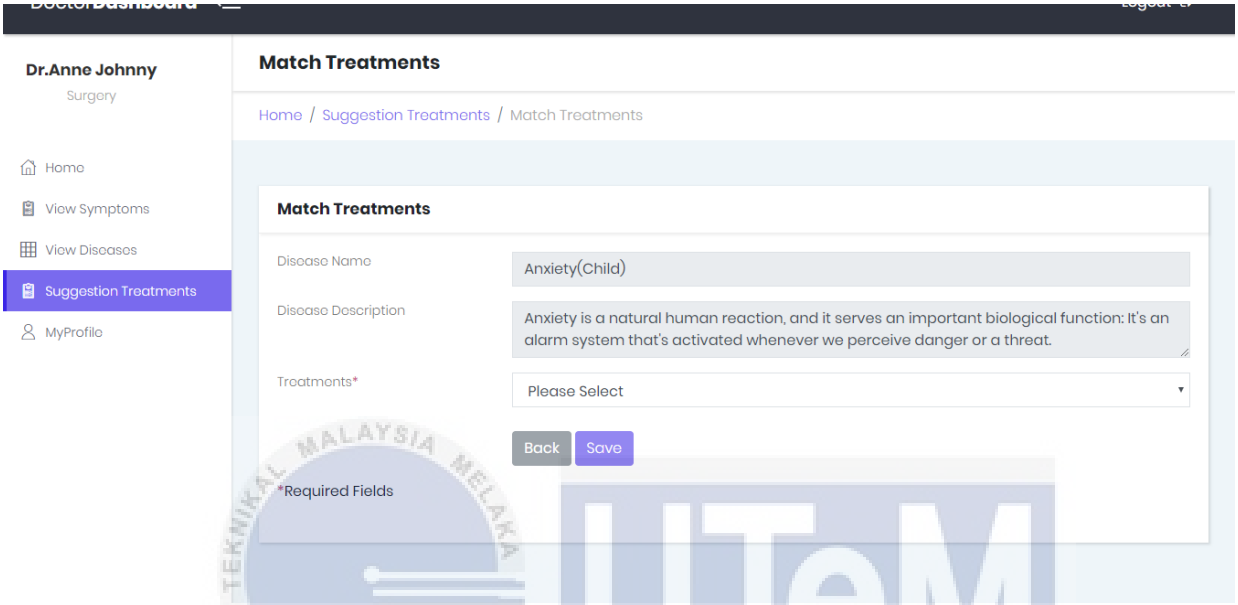


Figure 4.23: Match Suggestions Treatment with Disease Screen Interface

Figure 4.23 shows match suggestion treatment with disease page of Web Based Diseases Prediction System. In this interface, the doctor will match the suggestion treatment with the disease that are suitable and good for patient references. Doctor needs to choose list of treatment from the dropdown menu. This is because the same treatment can be use with different disease. After the doctor choose one treatment, then doctor needs to click button save. When the doctor click button save, the page will refresh, and the list of treatment will show under the form.

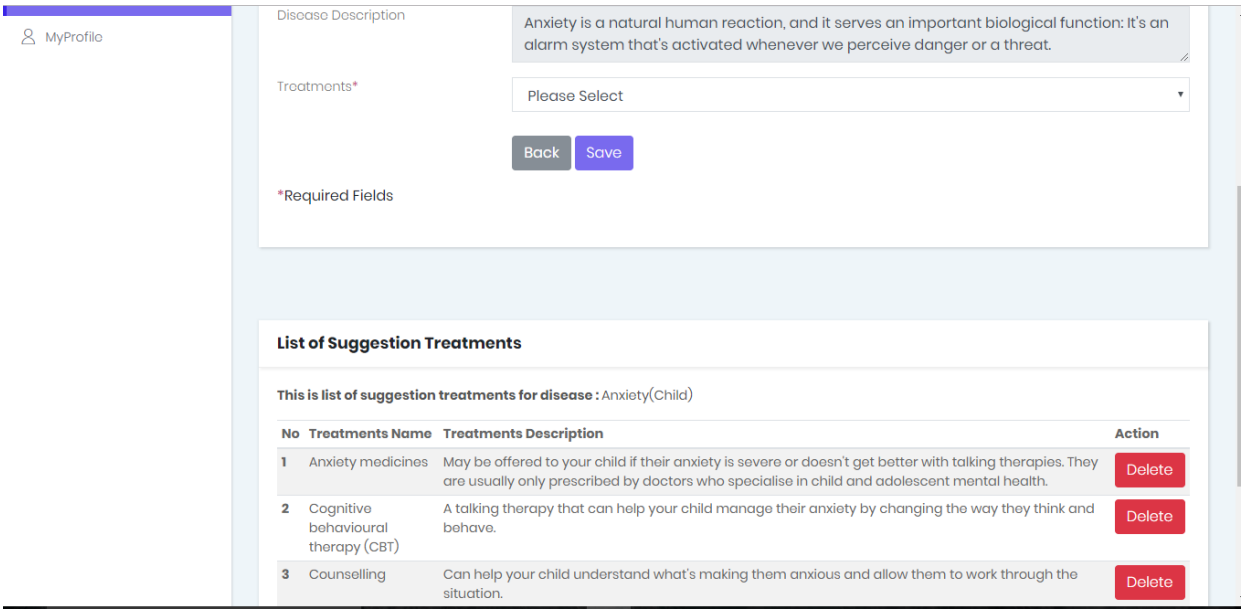


Figure 4.24: List of Suggestions Treatment Screen Interface

Figure above shows the list of treatment page of Web Based Diseases Prediction System. The list of suggestions treatment will be created when the doctor match the treatments with the disease. After the doctor insert the treatment, the page will be refresh and the list of treatments will be shown under the forms. Besides, the doctor has an option to delete the treatment that have been added into the table by clicking red button delete.

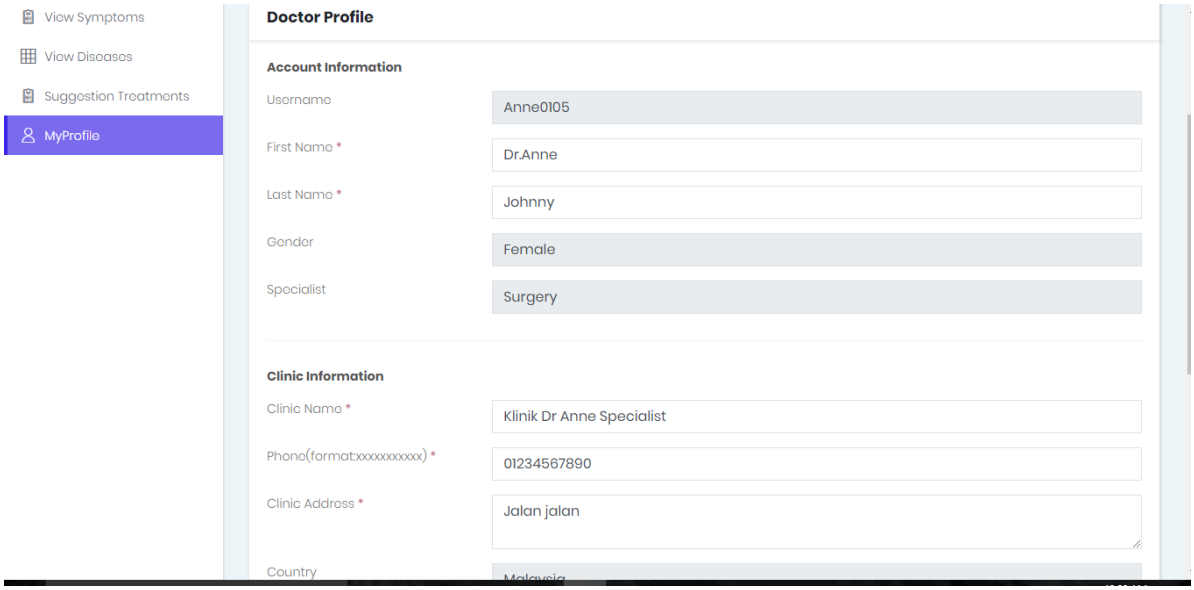


Figure 4.25: Doctor Profile Screen Interface

Figure 4.25 show the doctor profile page of Web Based Diseases Prediction System. The doctor has an option to update the profile details which are first name, last name, clinic name, clinic address, clinic state, clinic country and clinic number phone. Besides, doctor can update the password by clicking the button change password to procced the process.

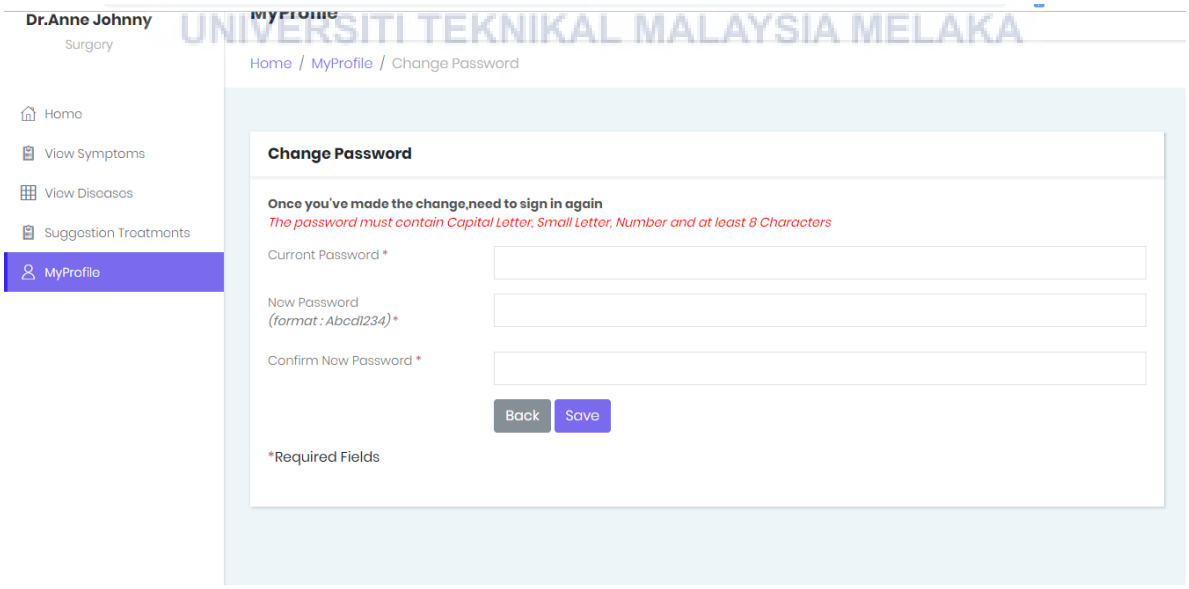


Figure 4.26: Doctor Change Password Screen Interface

Figure above shows change password page of Web Based Disease Prediction System. The doctor has an option to update the password. If the doctor updates the password, automatically the doctor will be log out and need to log in back using new password.

Patient User Interface

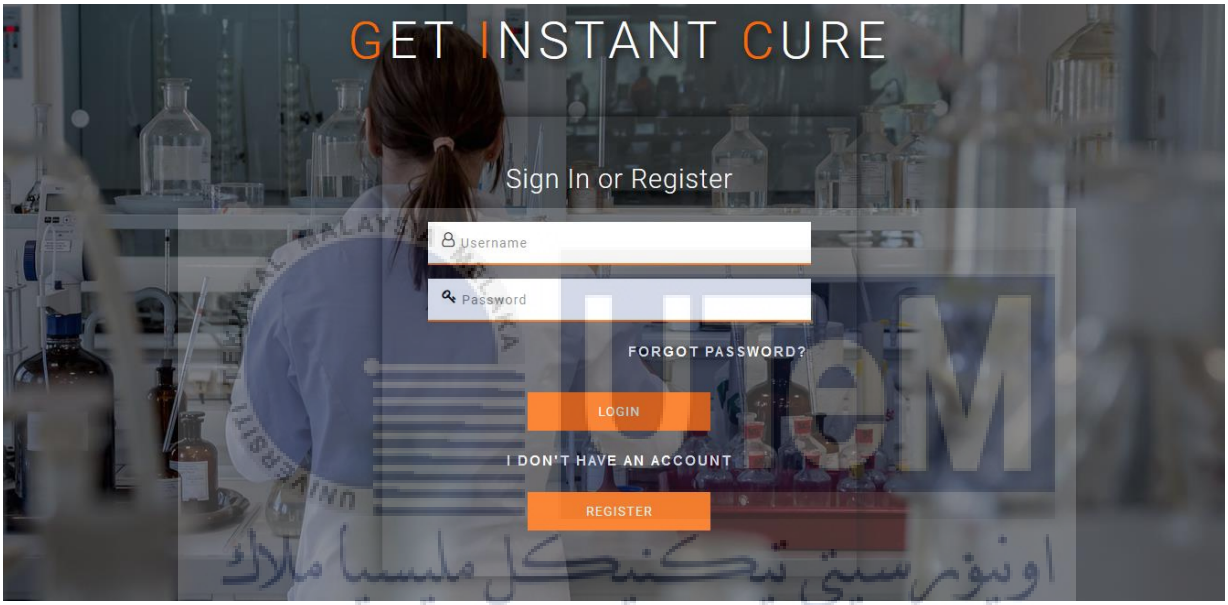


Figure 4.27: Patient's Login Screen Interface

Figure shows the login screen where the patient needs to input username and password to access into the system. The system will validate the input username and password. If the input is empty, there is error message will show on the screen to ask user fill in the blank. Also, the system will validate wether the username and password is registered into the database. If data validation true and no exist error system will proceed to next process.

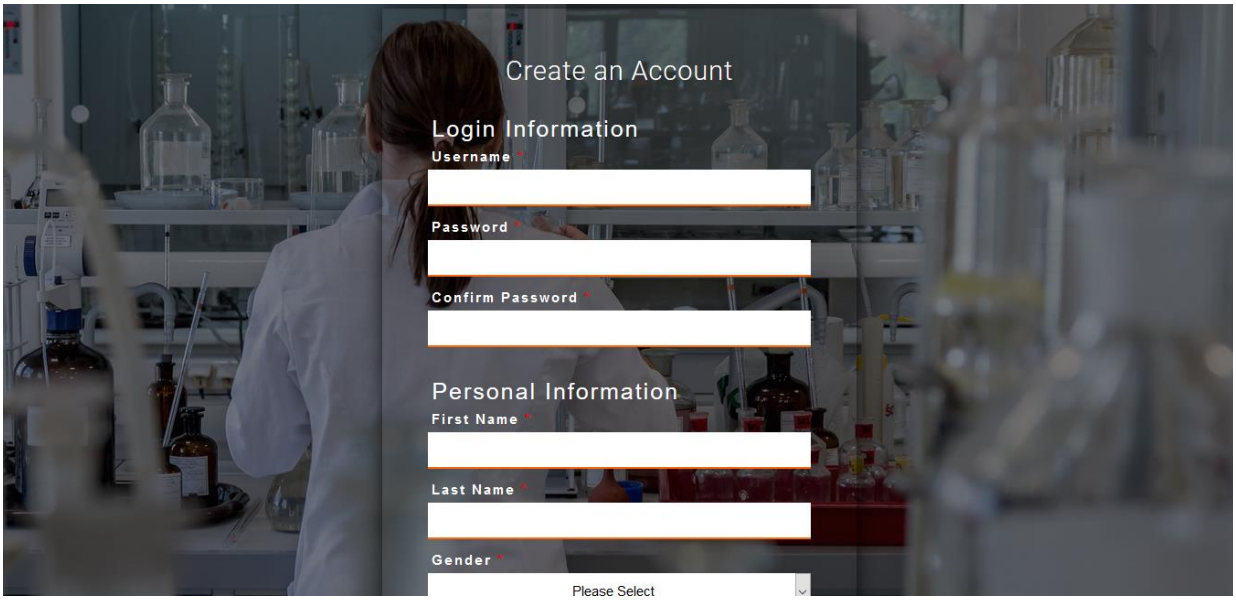


Figure 4.28: Patient's Registration Screen Interface

Figure 4.28 shows the patient's account registration screen where the user needs to fill in all the registration forms which are contain username, password, confirm password, first name, last name, age, gender, email, security questions and answers. After the registration is successful, the user will be brought to the login screen.

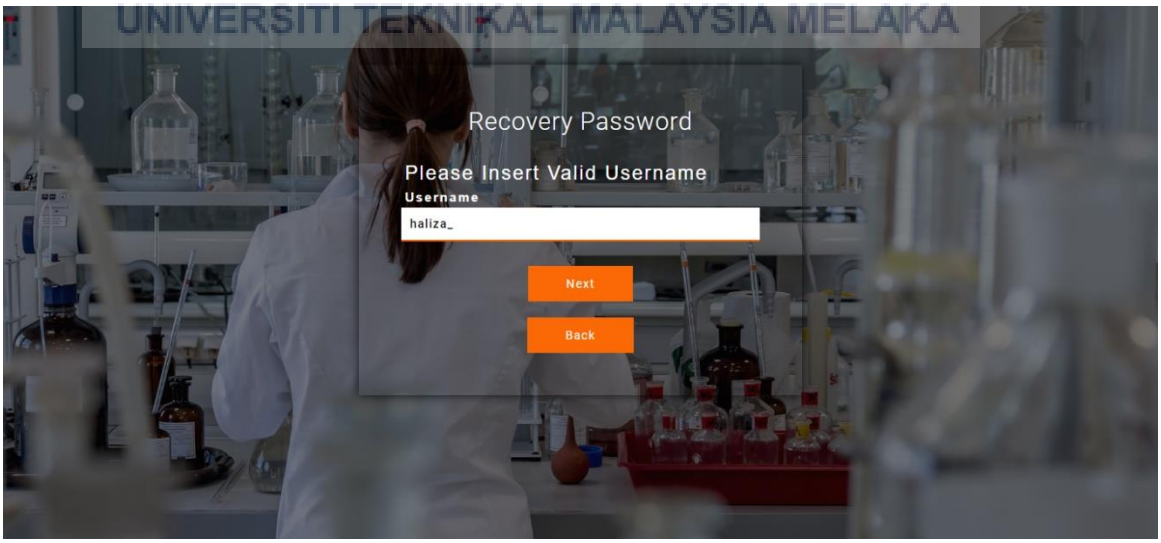


Figure 4.29: Patient's Recovery Password Screen Interface

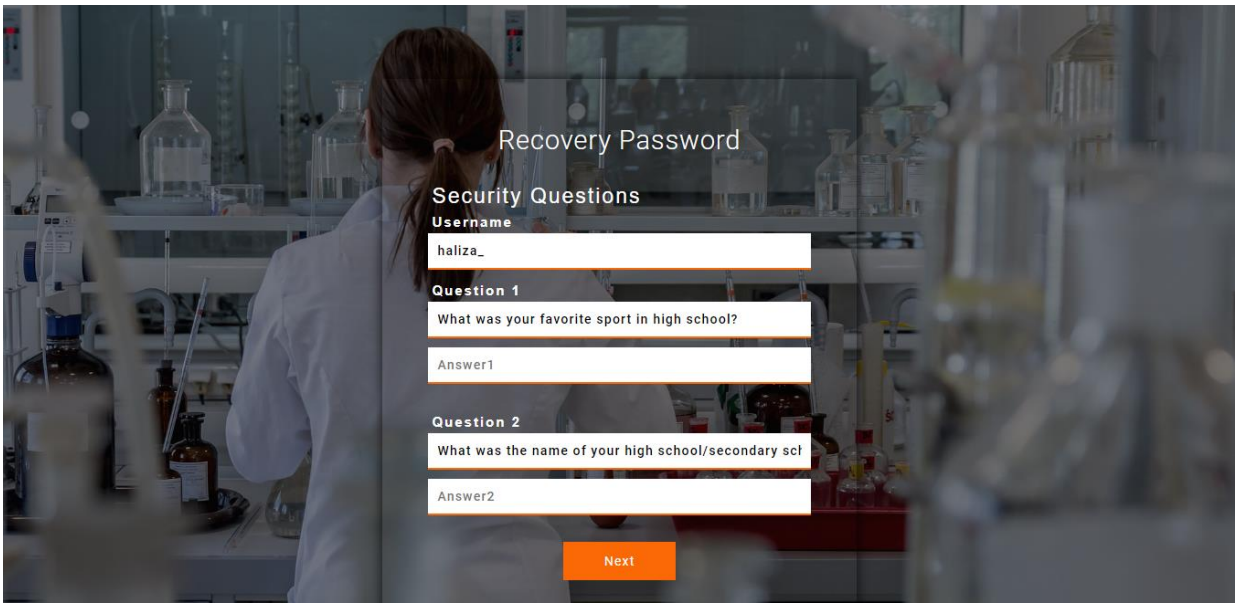


Figure 4.30: Patient's Recovery Password Screen Interface

Figure 4.29 and figure 4.30 show the interface that when the patient click button reset password. The user needs to input the username, then the system will process and find in database the security questions that had been choose by the user when the first-time user registered the account. After that, user needs to answer the questions as the answer must be same in the database. The system will validate the answers either correct or wrong. If correct, user can proceed which is user can do reset password by input the new and confirm password. If the validation is error user need to do it again.

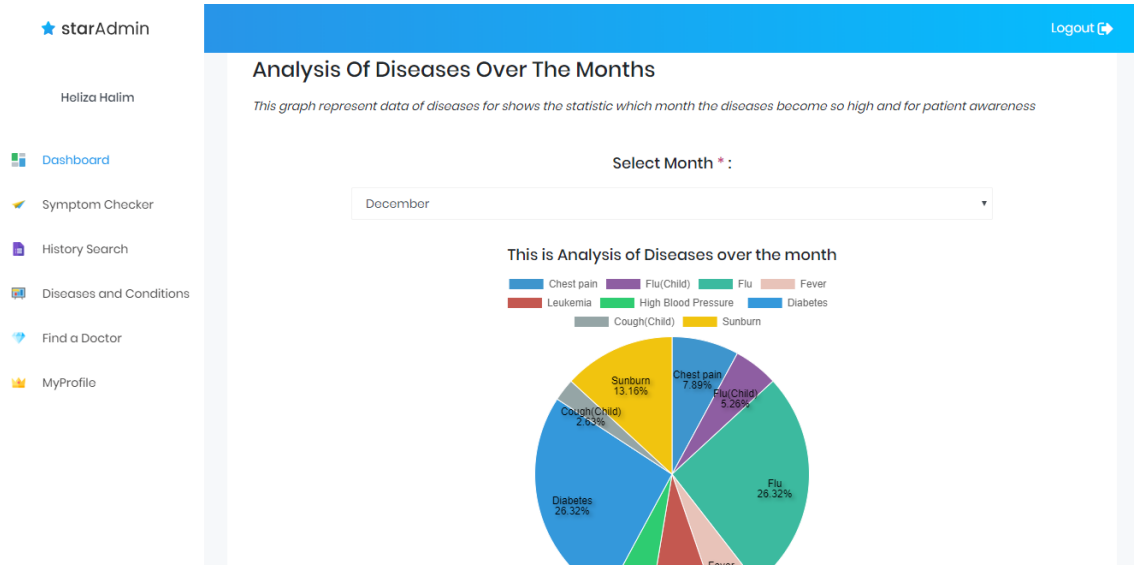


Figure 4.31: Patient's Home Screen Interface

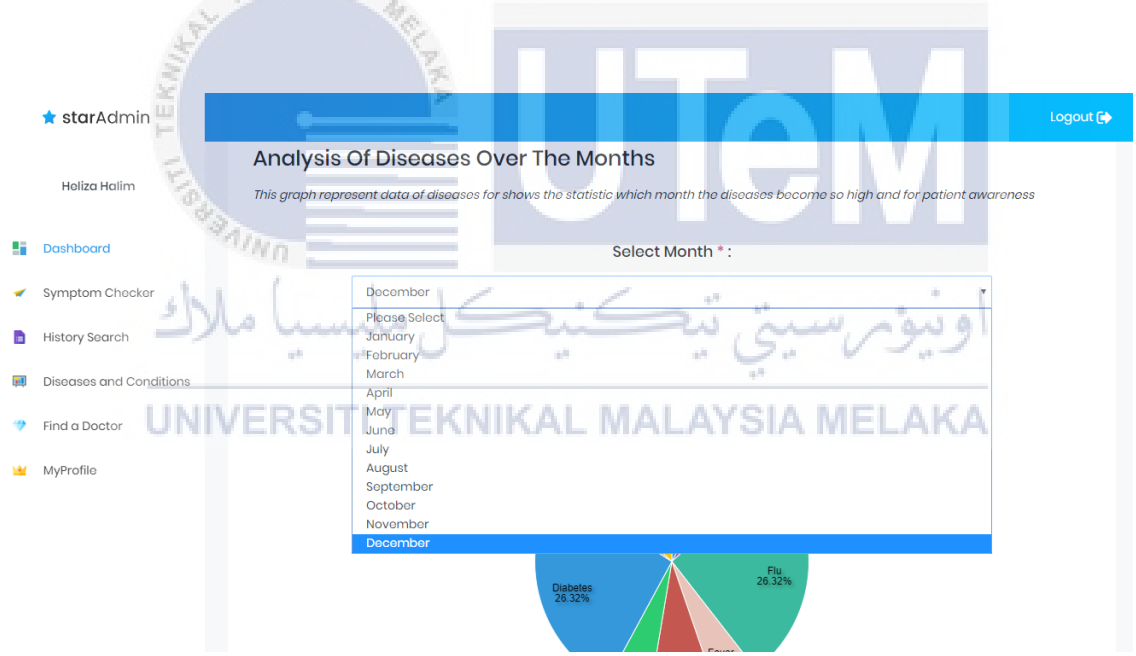


Figure 4.32: Patient's Home Screen Interface

Figure 4.31 and figure 4.32 show the main page of the patient system. Home page will display a pie chart to show the statistic of diseases. The pie chart will shows the data in current month, user have an option to view data in another month by select month from dropdown menu.

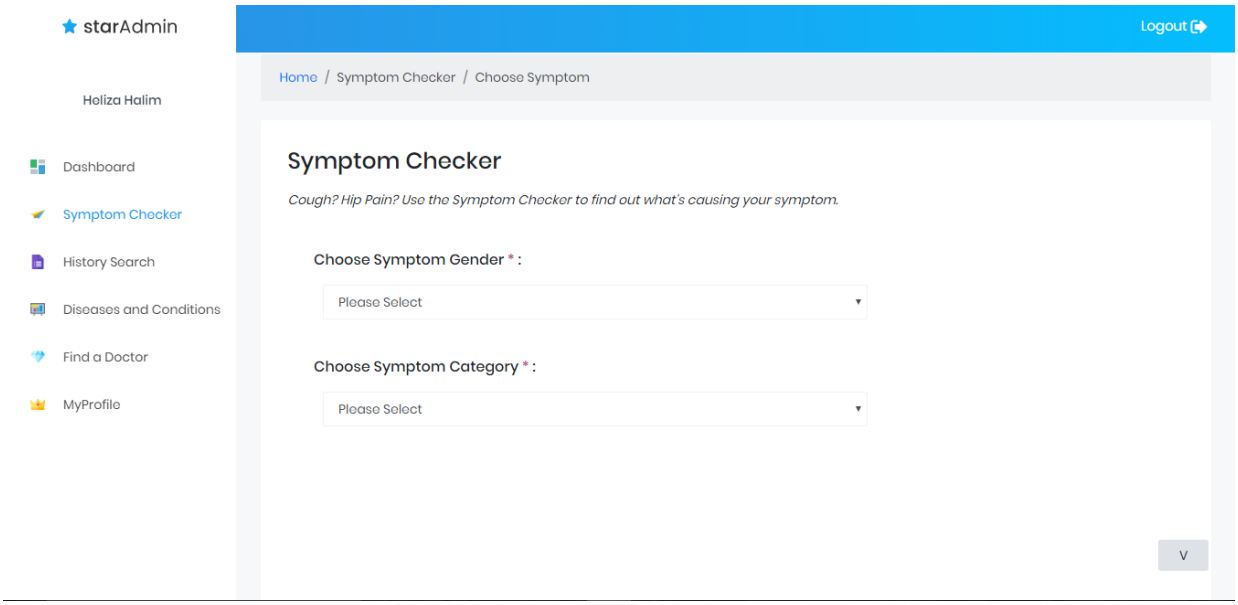


Figure 4.33: Symptom Checker Screen Interface

Figure above shows the symptom checker page of Web Based Diseases Prediction System. This symptom checker page will provide a list of symptoms which is categorized by the body part. Before that, patient must choose symptom gender and symptom category which are male or female and adult symptoms or child symptoms to view the list. In this page, patient can identify possible disease related to the symptoms. The more symptoms patient selects, the more accurate the result will be. Also, patient can select the most severe symptom first to find the possible diagnosis not an actual diagnosis.

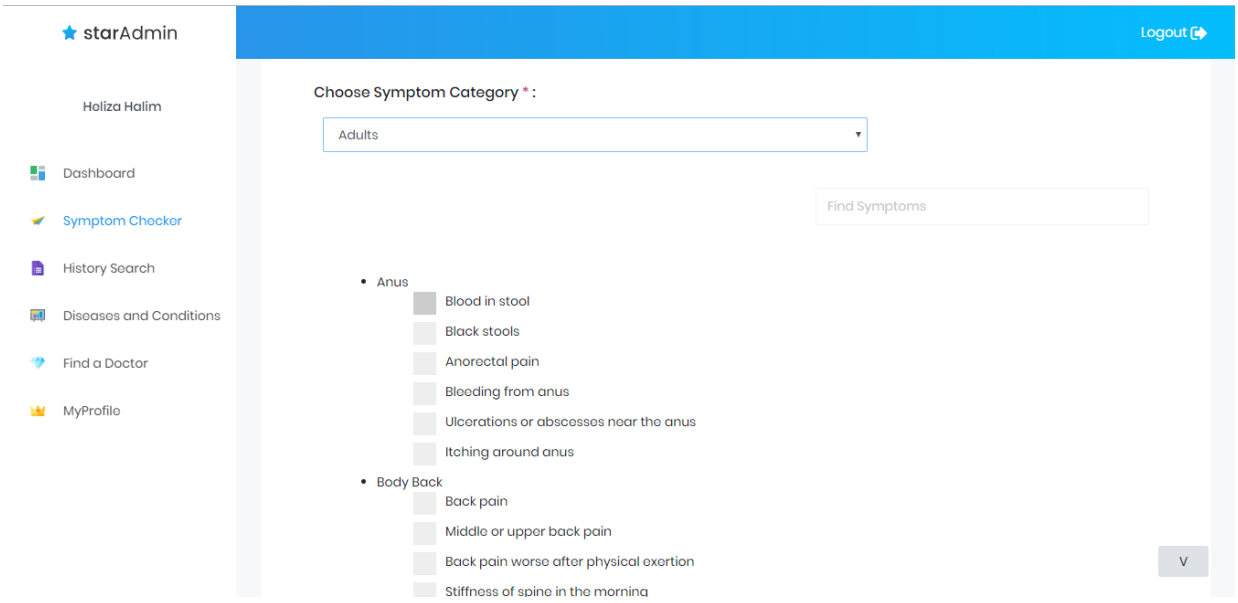


Figure 4.34: List of Symptoms Screen Interface

Figure above shows the list of symptoms page of Web Based Disease Prediction System. The list of symptoms shown after patient choose symptom gender and category. The list of symptoms is listed and categorized by the body part to easy the patient. Next, patient must select two or more than two symptoms before find the possible disease.

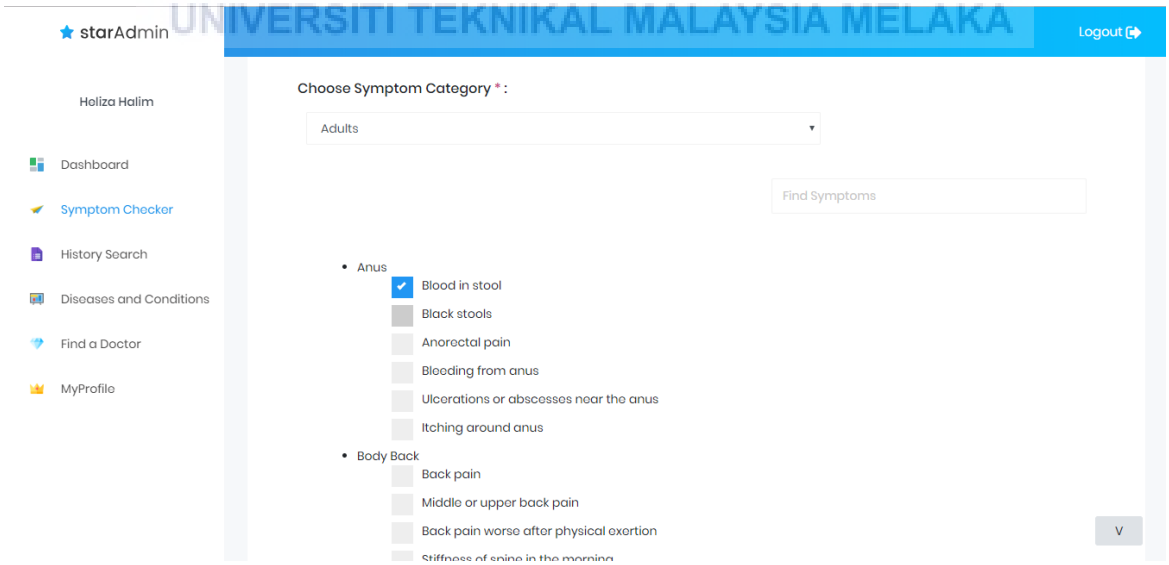


Figure 4.35: Symptom Checker Screen Interface

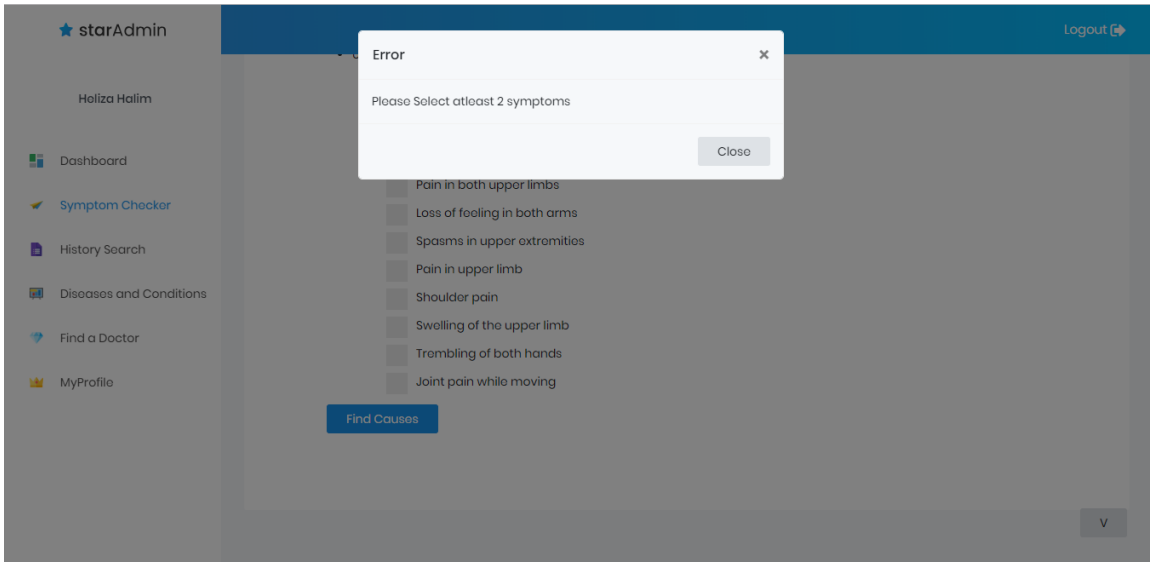


Figure 4.36: Symptom Checker Screen Interface

Figure 4.35 and figure 4.36 show the symptom checker page of Web Based Disease Prediction System. The system display list of symptoms that patient might have. User must select at least two symptoms to get accurate data of possible diseases. In figure 4.36 shows if user select only one symptom, it will pop out an alert to remind user for select at least two symptoms.

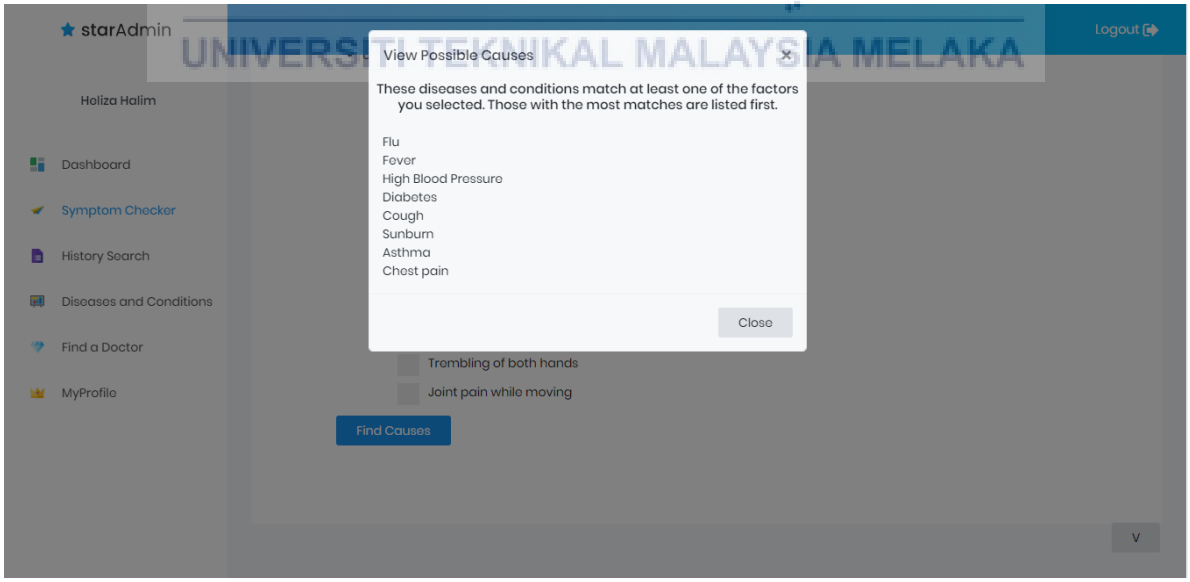


Figure 4.37: Possible Result Screen Interface

Figure above shows the possible result page of Web Based Diseases Prediction System. The possible result output is the suspected diseases after the patient selects from list of symptoms. The suspected diseases are listed as the most match with the symptoms will listed first.

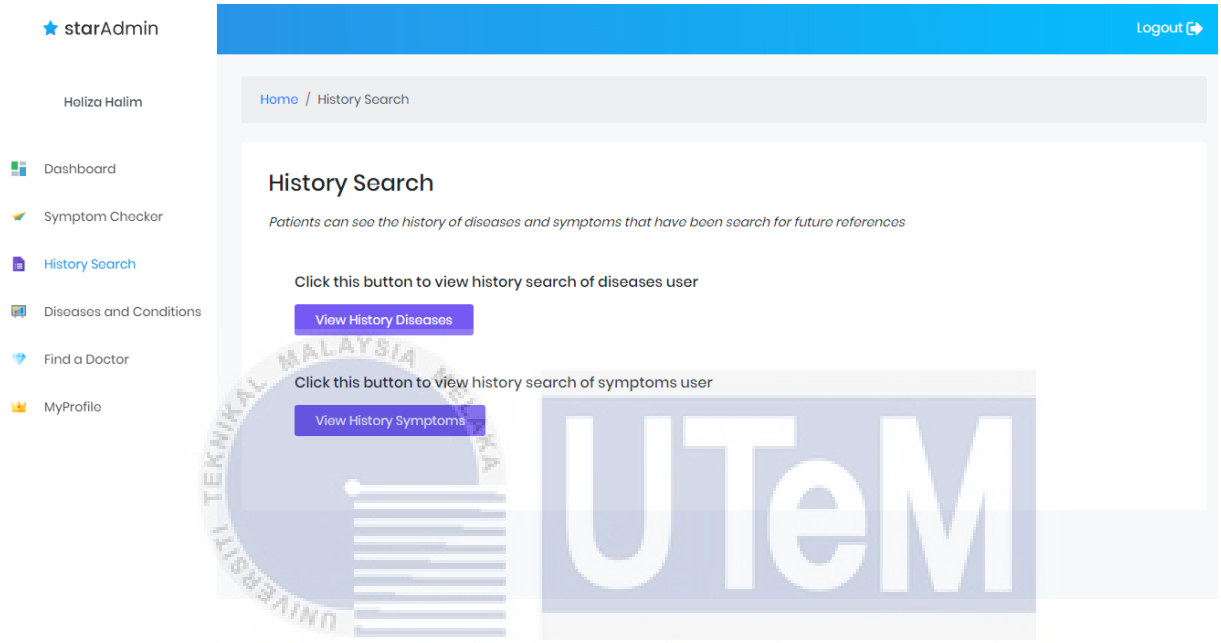


Figure 4.38: Search History Screen Interface

Figure above shows search history page of Web Based Diseases Prediction System. Patient can view search history of diseases and search history of symptoms. Both histories are based on user select as it can be user references for future.

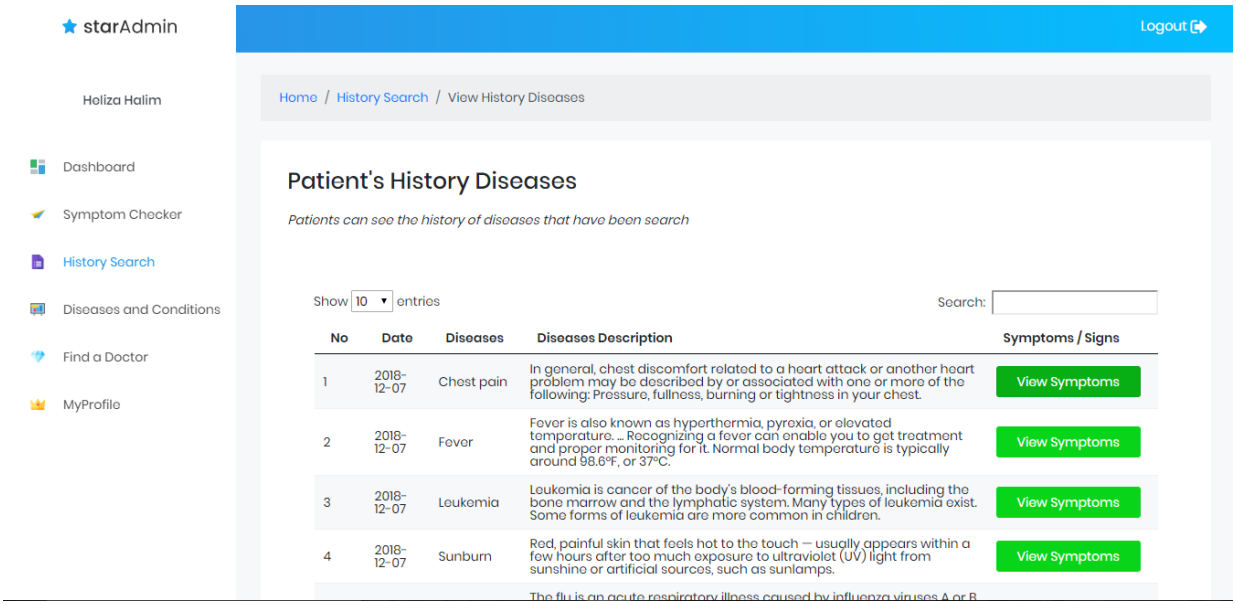


Figure 4.39: Search History Diseases Screen Interface

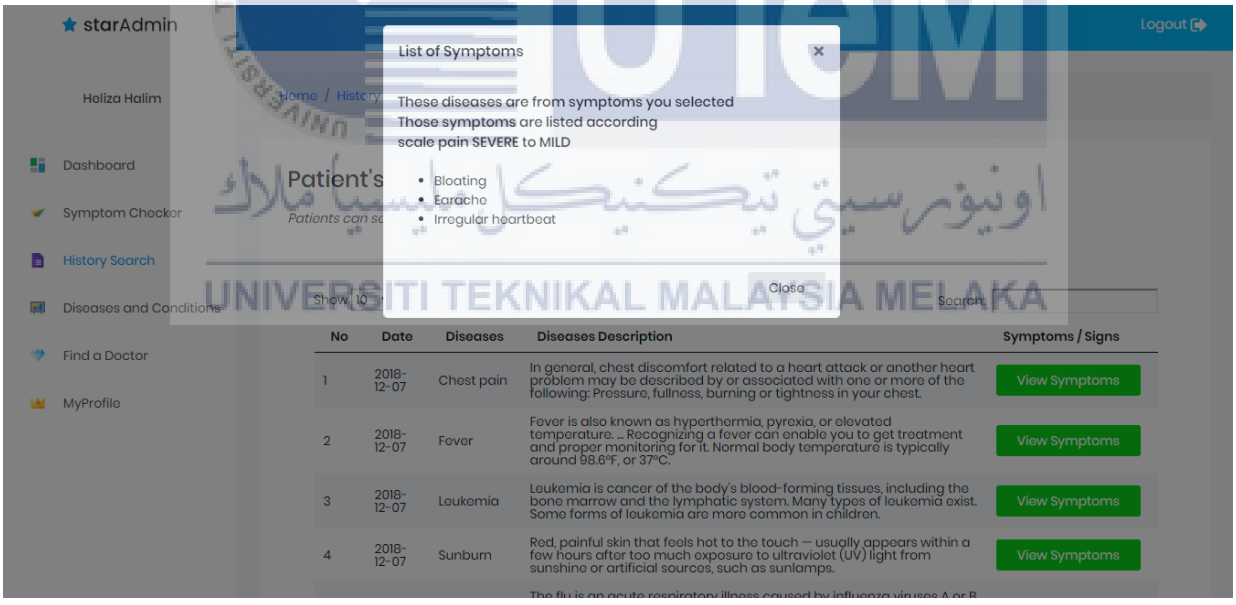


Figure 4.40: Search History Diseases Screen Interface

Figure above shows the list of search history diseases for each patient according to current log in. Patient can refer what possible diseases that have been search for future references. In figure 4.40, if patient click the view symptoms button, the system will pop out the list of symptoms that user selected only.

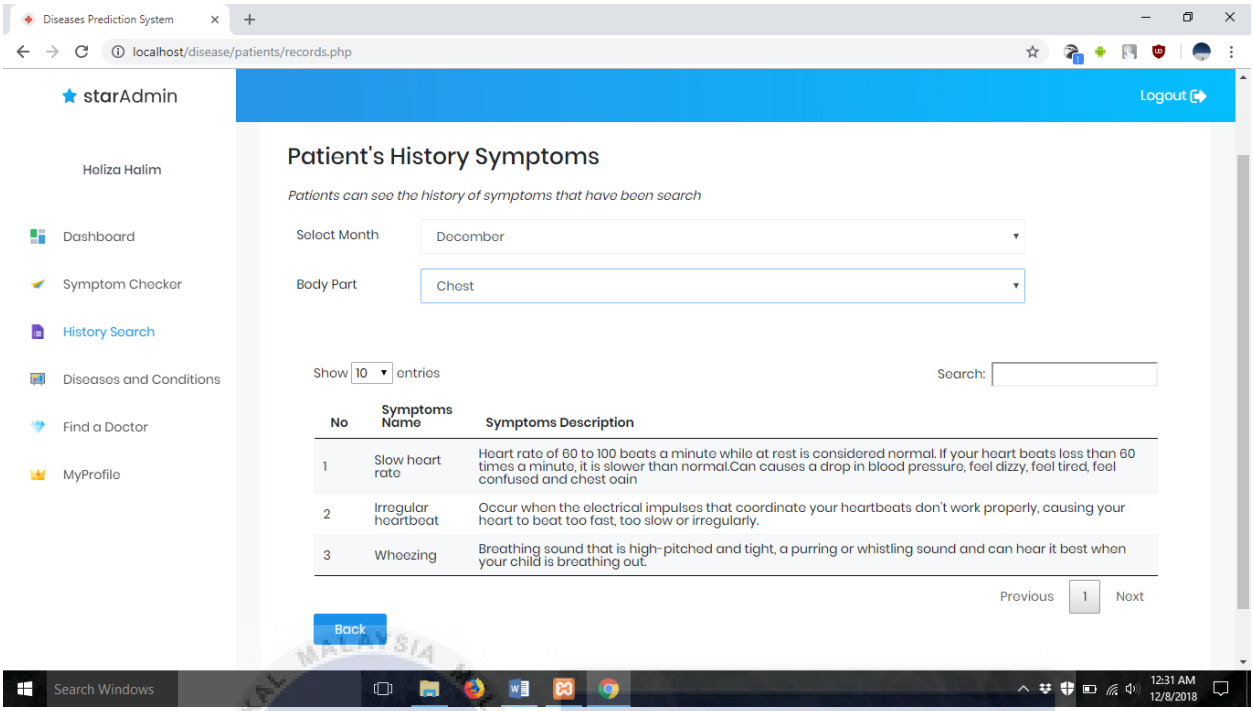


Figure 4.41: Search History Symptoms Screen Interface

Figure above shows the table list of search history symptoms for each patient according to current log in. Patient can view back the symptoms that have been search by filtering by months and body part. After user select both drop down menu, the table below will refresh and shown the list of symptoms.

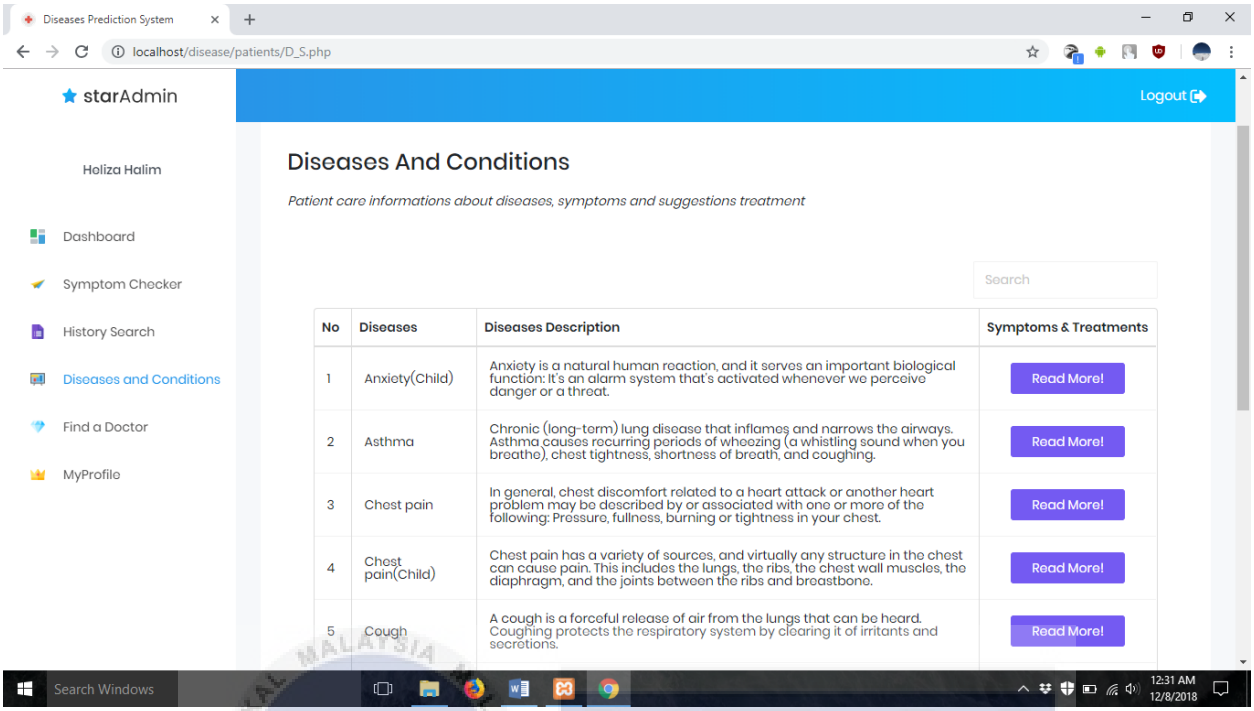


Figure 4.42: Diseases and Conditions Screen Interface

Figure above shows the interface diseases and conditions for public reading material. The screen displays a table that contains diseases name, diseases description and column for symptoms and treatments. Patient can continue read by clicking the button read more for each disease that patient click.

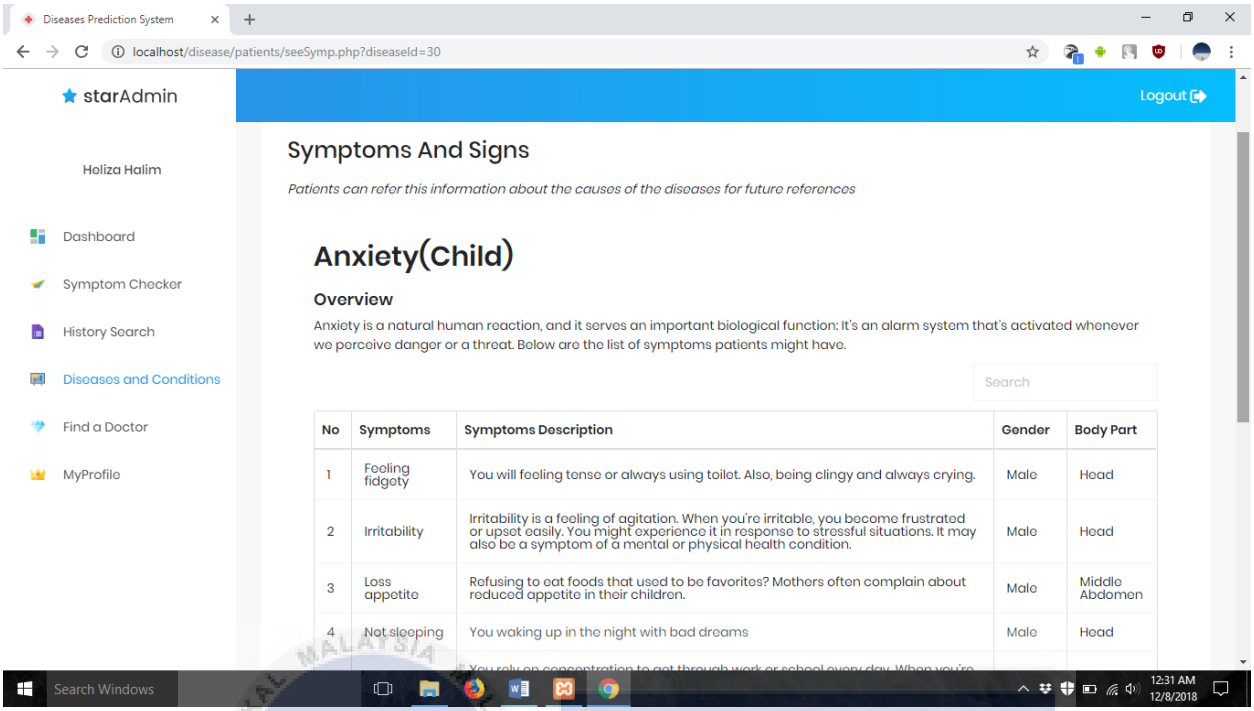


Figure 4.43: Symptoms and Signs Screen Interface

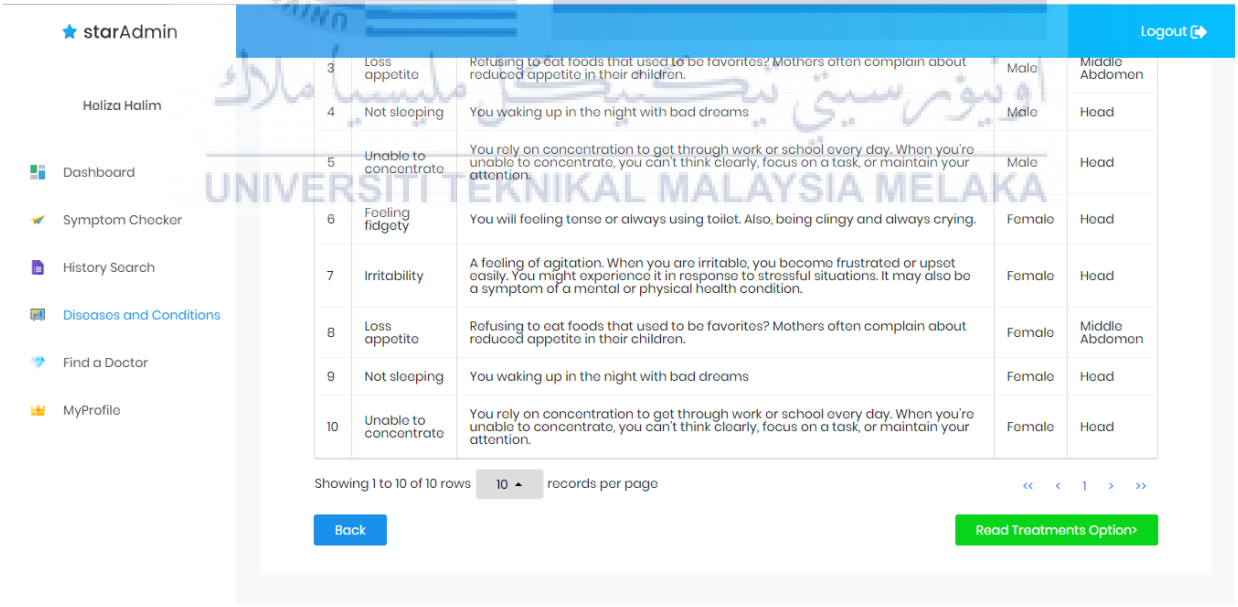


Figure 4.44: Symptoms and Signs Screen Interface

Figure 4.43 shows the interface symptoms and signs for each disease that patient choose. This interface shows the disease name, overview of the disease and the list of symptoms that associated to the disease. In figure 4.44, when user scroll down the interface there is a green button for patient to read the suggestions treatment for that disease. If user click on that button it will open a new page about suggestions treatment.

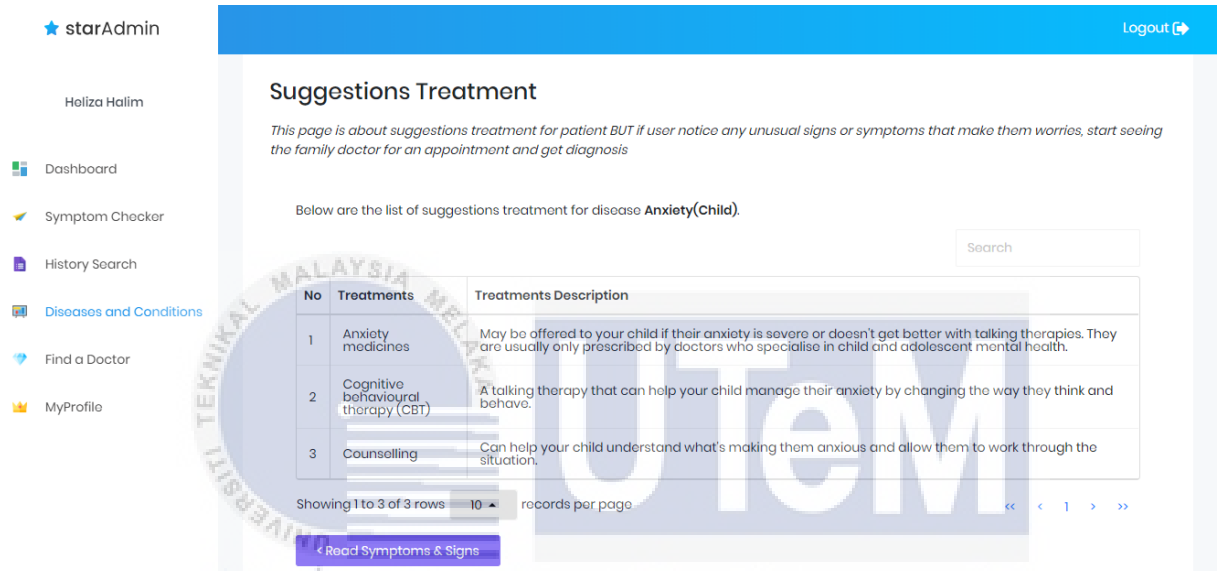


Figure 4.45: Suggestions Treatment Screen Interface

Figure 4.45 shows the interface suggestion treatment for that each disease. Patient can read the treatment for references.

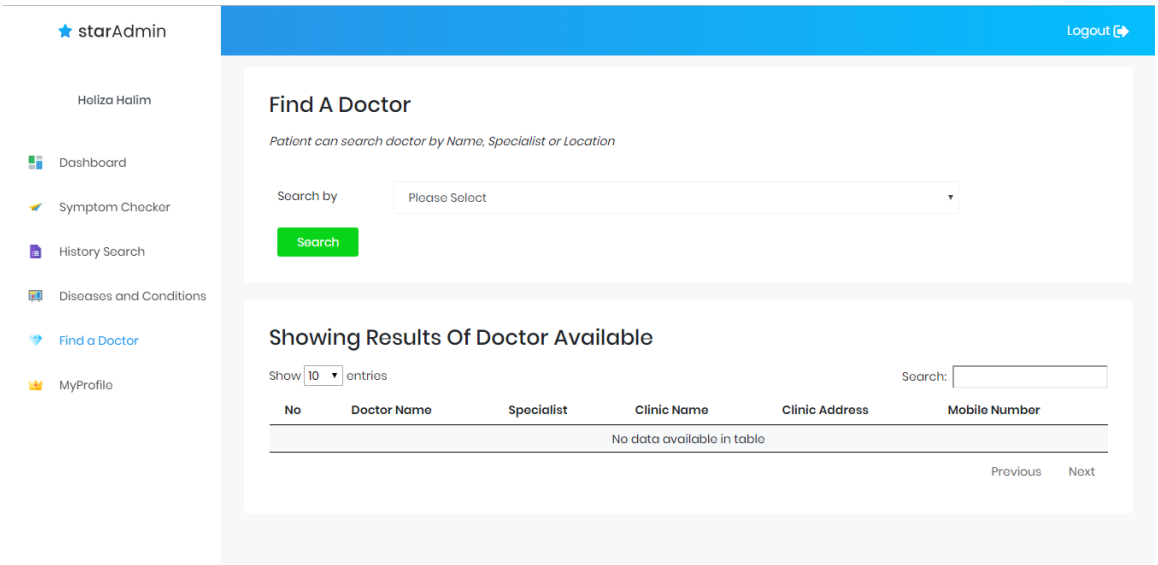


Figure 4.46: Find Doctor Search Screen Interface

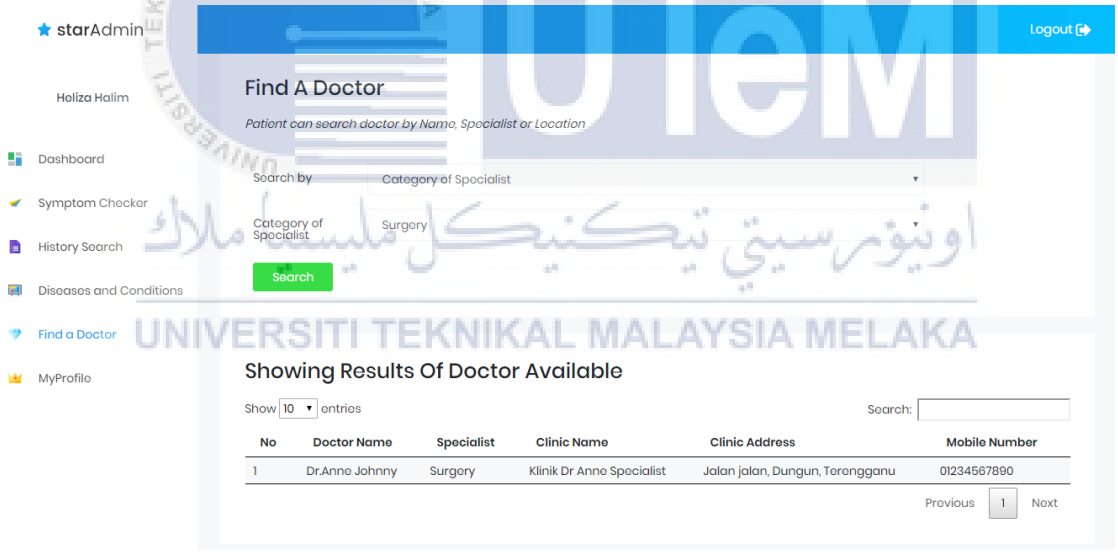


Figure 4.47: Find Doctor Search Screen Interface

Figure 4.46 shows find a doctor page of Web Based Diseases Prediction System. Patient can find a doctor that are available to get further diagnosis. Hence, patient can do searching by three options which are name of doctor, category of specialist and location of clinic. For example, in figure 4.47 that if the patients search by name of doctor, then the page will refresh and show the list of information of doctor available in the table. The table consists of doctor name, specialist, clinic name, clinic address and mobile number.

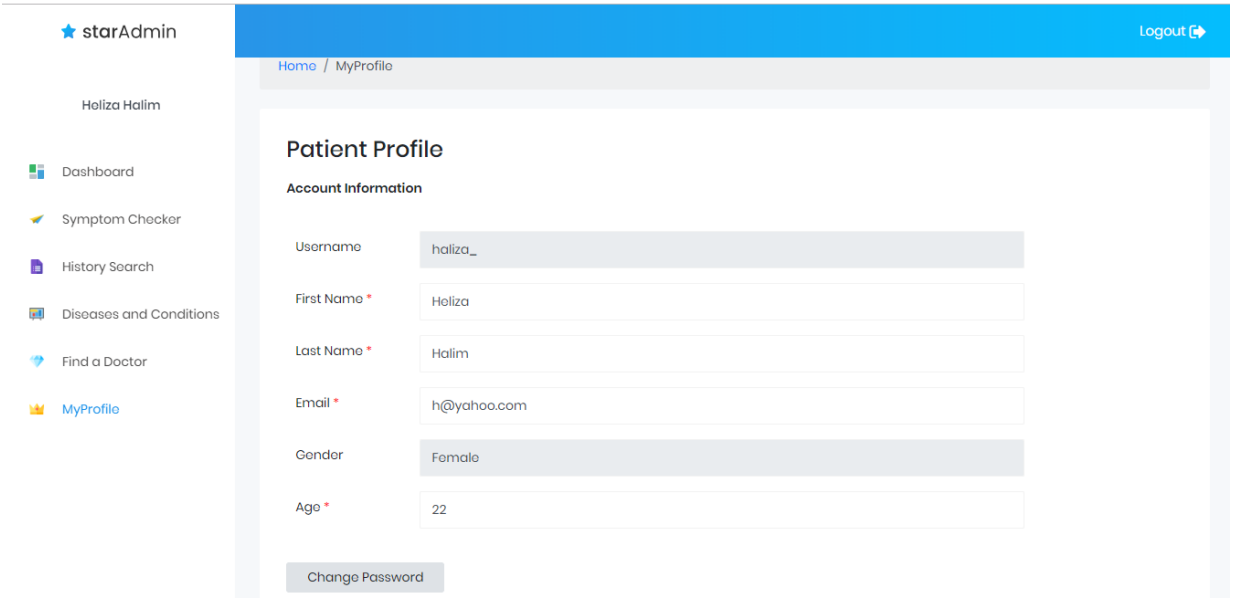


Figure 4.48: Patient Profile Screen Interface

Figure 4.48 shows the patient profile page of Web Based Diseases Prediction System. Patient has an option to update the profile details which are first name, last name, email and age. Besides, patient can update the password by clicking the button change password to procced the process.

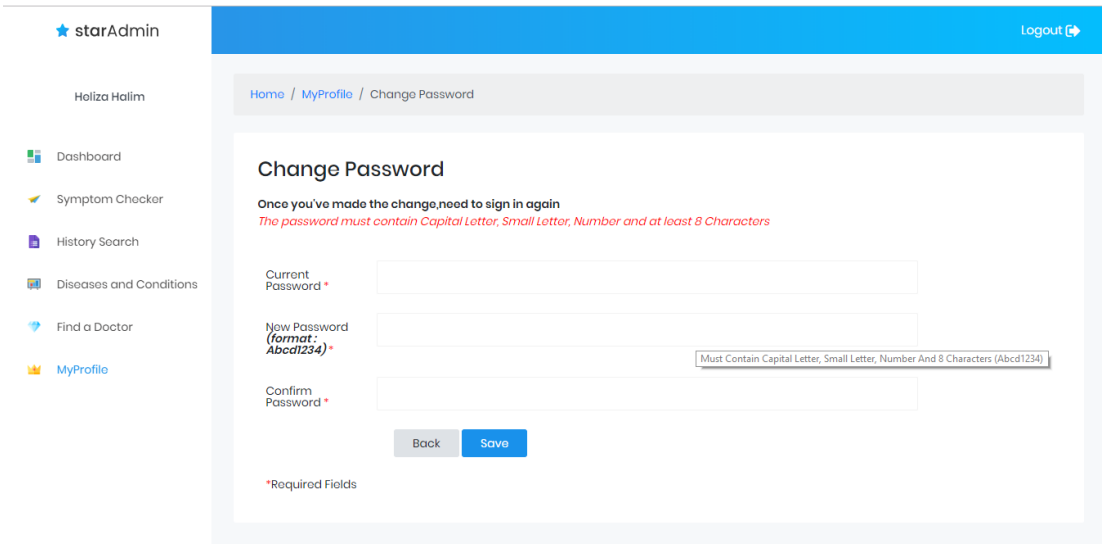


Figure 4.49: Patient Change Password Screen Interface

Figure above shows change password page of Web Based Disease Prediction System. The patient has an option to update the password. If the patient updates the password, automatically the patient will be log out and need to log in back using new password.

4.2.2.1 Navigation Design

In this section that is navigation design, there is navigation diagram that is a low-level design work as a way to navigate round the presentation parts of the system. Figure below shows the navigation diagram of Web Based Diseases Prediction System as follow.

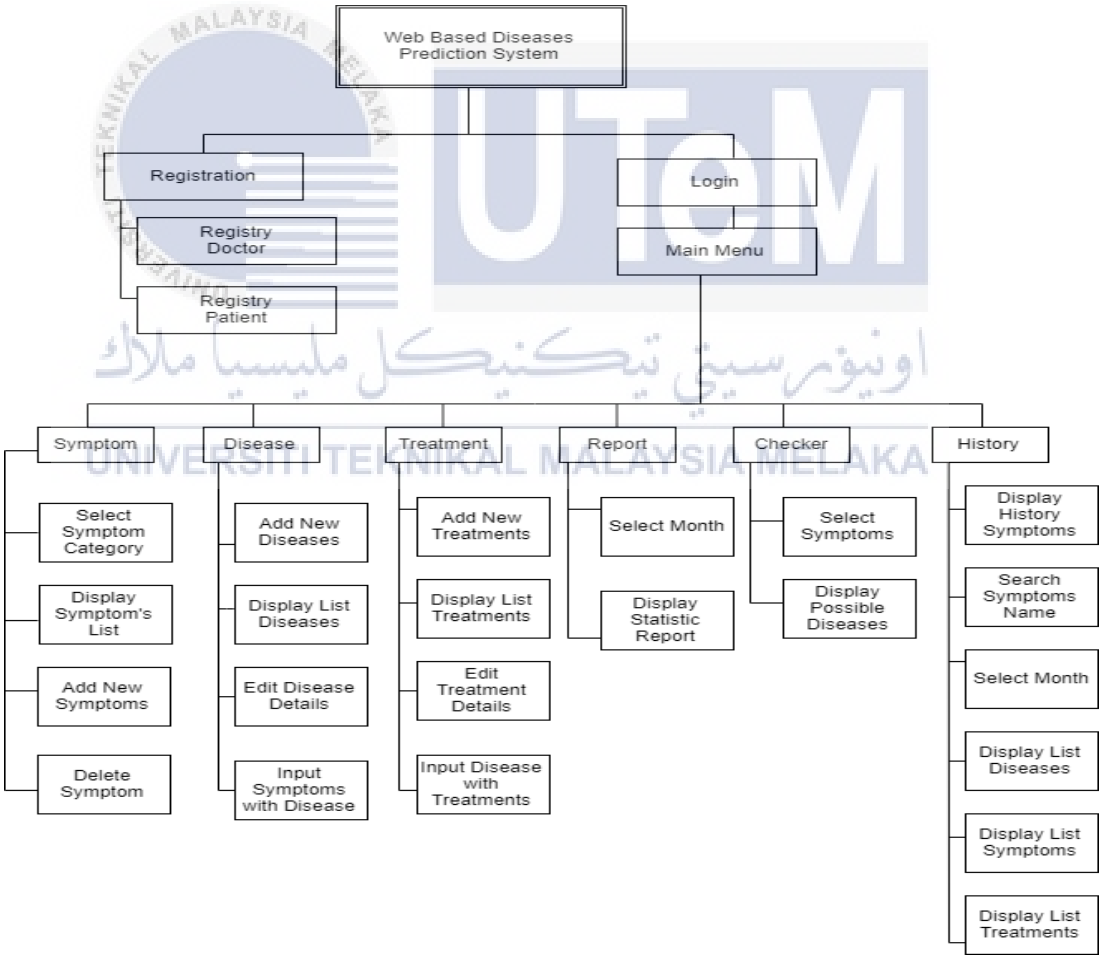


Figure 4.50: System Navigation Diagram

4.2.2.2 Input Design

In this part which is input configuration, has the way toward changing over a client arranged depiction of the contribution to a PC based framework. The capacity is to plan and characterize kind of contributions for interface, for example, content box, content territory, alphanumeric, radio catch and the sky is the limit from there. The info plans for this system are appeared in figure beneath.

Table 4.0: Input Design

Interface/Form	Field Name	GUI Control	Validation Control
Login(doctor)	Username	Text field	Must not be blank
	Password	Password field	Mandatory fields
Login(patient)	Username	Text field	Must not be blank
	Password	Password field	Mandatory fields
Report statistic	Months	Drop down menu	Must not be blank
Add new disease	Disease name	Text field	Must not be blank
	Disease description	Text area	Must not be blank
Add new treatment	Treatment name	Text field	Must not be blank
	Treatment description	Text area	Must not be blank
Match treatment and disease	Disease name	Drop down menu	Must not be blank
	Treatment name	Drop down menu	Must not be blank
Change password	Current password	Password field	Must not be blank
	New password	Password field	Must not be blank
	Confirm password	Password field	Must not be blank
Add new symptom	Symptom Name	Text field	Must not be blank
	Symptom description	Text area	Must not be blank
	Symptom category	Drop down menu	Must not be blank
	Body part	Drop down menu	Must not be blank
	Symptom category	Drop down menu	Must not be blank

Match symptom and disease	Body part	Drop down menu	Must not be blank
	Symptom name	Drop down menu	Must not be blank
View symptom	Symptom category	Drop down menu	Must not be blank
Search symptom	Symptom name	Text field	Must not be blank
	Symptom description	Text area	Must not be blank
Search disease	Disease name	Text field	Must not be blank
	Disease description	Text area	Must not be blank
Update profile	First name	Text field	Must not be blank
	Last name	Text field	Must not be blank
	Age	Text field	Must not be blank
	Clinic name	Text field	Must not be blank
	Clinic city	Drop down menu	Must not be blank
	Clinic mobile number	Text field	Must not be blank
	Clinic state	Drop down menu	Must not be blank
	Clinic address	Text area	Must not be blank
	Email	Text field	Must not be blank
Edit new disease	Disease name	Text field	Must not be blank
	Disease description	Text area	Must not be blank
Symptom checker	Symptom category	Drop down menu	Must not be blank
	List of Symptom	Checkbox	Must not be blank
Search doctor	Search By specialist, name and area	Drop down menu	Must not be blank
View history disease	Months	Drop down menu	Must not be blank
View history symptom	Months	Drop down menu	Must not be blank
	Body part	Drop down menu	Must not be blank

4.2.2.3 Output Design

The yield plan that is the technique to clarify what the framework could deliver. A yield configuration could be in term of message box, notification of error and additional.

Table 4.1: Output Design

Form	Output Component	Description
Login	Display authentication form	User interact with system
Report statistic	Display information of reporting and update report information	System will display information and update if needed.
List symptoms	Display list of symptoms that categorized by symptom category and body part	Let the user see list of symptoms
List diseases	Display list of diseases	Let the user see list of diseases
List treatments	Display list of treatments for each disease	Let the user see list of treatments
Available doctor	Display list of doctors that available for future diagnosis	Let the patient search and see list of doctors that available
History symptom	Display history search of symptoms	Let the patient see all the history symptoms that filter by month and body part
History disease	Display history search of disease	Let the patient see all the history diseases that filter by month

4.2.3 Database Design

Database configuration is the way toward creating a point by point information model of database. This information demonstrate contains all the required coherent and physical plan decisions and physical stockpiling parameters expected to produce a structure in an information definition dialect, which would then be able to be utilized to make a database.

4.2.3.1 Conceptual and Logical Database Design

There are eight (10) tables in Web Based Diseases Prediction System database.

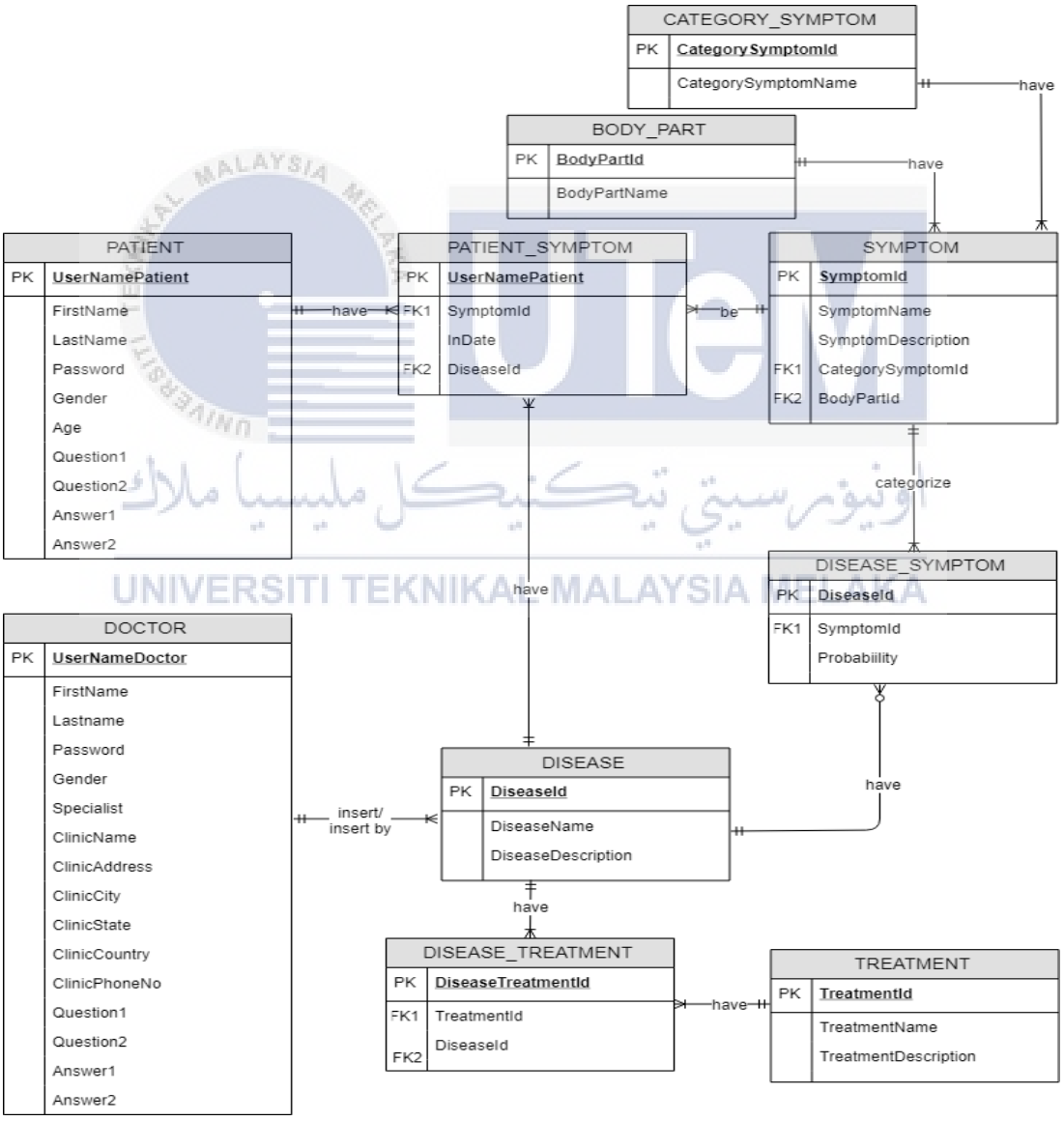


Figure 4.51: Entity Relational Diagram

Figure 4.5.4 shows during the design phase, the entity relational diagram of the Web Based Diseases Prediction System is defined. The database chosen is MySQLi, the tables that database contains are doctor, patient, disease, symptoms, disease_symptom, patient_symptom, body_part, treatments, disease_treatment and category_symptom tables. The database is already undergone the normalization processes.

4.2.3.2 Business Rule

These rules are intended to prevent disruption in a company or business. Business rules are used every day to define entities, attributes, relationships and constraints. Usually the database is used for the organization that stores or uses data to be an explanation of a policy, procedure or principle. There are the businesses rule defined:

i. One patient can have one or many symptoms, and one symptom can be on one or many patients.
ii. One patient can have one or many diseases, and one disease can be on one or many patients.
iii. A symptom can be categorized in one or many diseases, and a disease can have one or many symptoms.
iv. One symptom can have one and only body part, and one body part can have one or many symptoms.
v. A symptom can have one and only category symptoms, and a category symptom can have one or many symptoms.
vi. A doctor can insert one or many diseases, and one disease is insert by one doctor.
vii. A disease can have one or many suggestion treatments, and one treatment can be applied to one or many diseases.

4.2.3.3 Data Dictionary

Data dictionary is an information word reference contains a rundown of all documents in the database, the quantity of records in each document, and the names and sorts of each field. Most database the executives system keep the information word reference avoided clients to keep them from unintentionally crushing its substance. Information lexicons don't contain any real information from the database, just accounting data for overseeing it. Without an information lexicon, be that as it may, a database the executives system can't get to information from the database.

Table 4.2: Data Dictionary Doctor

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Doctor	UserNameDoctor	Doctor's Username	VARCHAR(30)	No	PK
	FirstName	First Name	VARCHAR(50)	No	
	LastName	Last Name	VARCHAR(50)	No	
	Password	Password	VARCHAR(30)	No	
	Gender	Gender	VARCHAR(20)	No	
	Specialist	Specialist	VARCHAR(30)	No	
	ClinicName	Name of Clinic	VARCHAR(50)	No	
	ClinicAddress	Address of Clinic	VARCHAR(50)	No	
	ClinicCity	City of Clinic	VARCHAR(20)	No	
	ClinicState	State of Clinic	VARCHAR(20)	No	
	ClinicCountry	Country of Clinic	VARCHAR(20)	No	
	ClinicPhoneNo	Clinic Mobile Number	VARCHAR(30)	No	
	Question1	Security Question	VARCHAR(20)	No	
	Question2	Security Question	VARCHAR(20)	No	
	Answer1	Security Answer	VARCHAR(50)	No	
	Answer2	Security Answer	VARCHAR(50)	No	

Table 4.3: Data Dictionary Patient

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Patient	UserNamePatient	Patient's Username	VARCHAR(30)	No	PK
	FirstName	First Name	VARCHAR(50)	No	
	LastName	Last Name	VARCHAR(50)	No	
	Password	Password	VARCHAR(50)	No	
	Gender	Gender	VARCHAR(20)	No	
	Age	Age	VARCHAR(40)	No	
	Question1	Security Question	VARCHAR(20)	No	
	Question2	Security Question	VARCHAR(20)	No	
	Answer1	Security Answer	VARCHAR(50)	No	
	Answer2	Security Answer	VARCHAR(50)	No	

Table 4.4: Data Dictionary Symptom

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Symptom	SymptomId	Symptom Number	INT(30)	No	PK
	SymptomName	Symptom Name	VARCHAR(50)	No	
	SymptomDescription	Symptom Description	VARCHAR(70)	No	
	CategorySymptomId	Category Symptom Number	INT(30)	No	FK
	SymptomGender	Symptom Gender	VARCHAR(20)	No	
	BodyPartId	Body Part Number	INT(30)	No	FK

Table 4.5: Data Dictionary Disease

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Disease	DiseaseId	Disease Number	INT(30)	No	PK
	DiseaseName	Disease Name	VARCHAR(50)	No	
	DiseaseDescription	Disease Description	VARCHAR(70)	No	

Table 4.6: Data Dictionary Body_Part

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Body_Part	BodyPartId	Body Part Number	INT(30)	No	PK
	BodyPartName	Body Part Name	VARCHAR(50)	No	

Table 4.7: Data Dictionary Category_Symptom

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Category_Symptom	CategorySymptomId	Category Symptom Number	INT(30)	No	PK
	CategorySymptomName	Category Symptom Name	VARCHAR(50)	No	

Table 4.8: Data Dictionary Patient_Symptom

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Patient_Symptom	UserNamePatient	Patient's Username	VARCHAR(30)	No	PK
	SymptomId	Symptom Number	VARCHAR(30)	No	FK
	InDate	Current Date the Data Insert	DATE	Yes	
	DiseaseId	Disease Number	INT(30)	No	FK

Table 4.9: Data Dictionary Disease_Symptom

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Disease_Symptom	DiseaseId	Disease Number	INT(30)	No	PK
	SymptomId	Symptom Number	VARCHAR(30)	No	PKFK
	Probability	Scoring for Data	DOUBLE	Yes	

Table 4.10: Data Dictionary Treatment

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Treatment	TreatmentId	Treatment Number	INT(30)	No	PK
	TreatmentName	Treatment Name	VARCHAR(50)	No	
	TreatmentDescription	Treatment Description	VARCHAR(70)	No	

Table 4.11: Data Dictionary Disease_Treatment

Table Name	Attribute Name	Contents	Data Type & Size	Null	PK or FK
Disease_Treatment	DiseaseTreatmentId	Disease Treatment Number	INT(30)	No	PK
	TreatmentId	Treatment Number	INT(30)	No	
	DiseaseId	Disease Number	INT(30)	No	

4.3 Detailed Design

In detailed design, this phase where the design is redefined and plans. Furthermore, this phase also the specifications and the estimation are created. This structure stage, for the investigation stage that had been made for the present framework and the prerequisite that has been distinguished and broke down for build up the framework. The prerequisite had been appearing by utilizing disposable philosophy. The feature ought to be on the rationale of the plan stage and the way to deal with fulfilling the necessities that have been gathered.

4.3.1 Software Design

In this section, will describe the module functions that have been stated in the system. Each of the function is explained by using data flow diagram for the flow of the function.

4.3.1.1 Log In

Process Name: Login.

Purpose: To let authorize patient and doctor to login into the system.

Input: Username(username), Password(password)

Output: Access to the system.

Logic/Pseudo Code:

- Step 1: Enter the username and password that has been registered.
- Step2: Click button Log In.
- After logging in, user will go to the user's page, patient will be to the patient's page and doctor to doctor page.

Screen/Report Format:

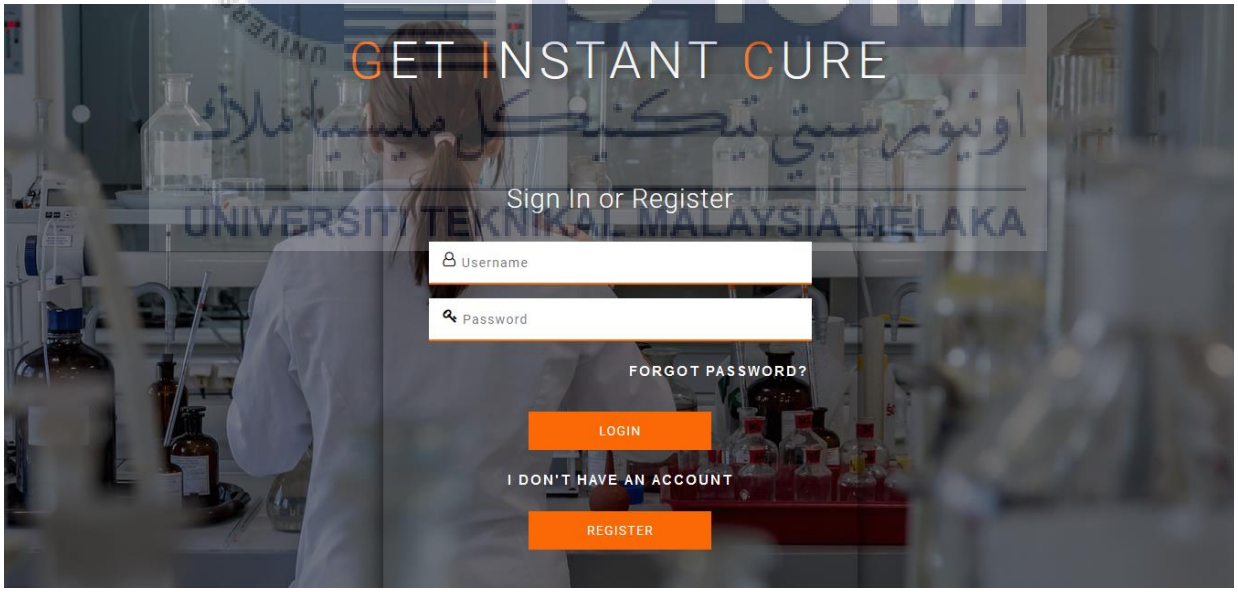


Figure 4.52: Patient Log in Screen Interface

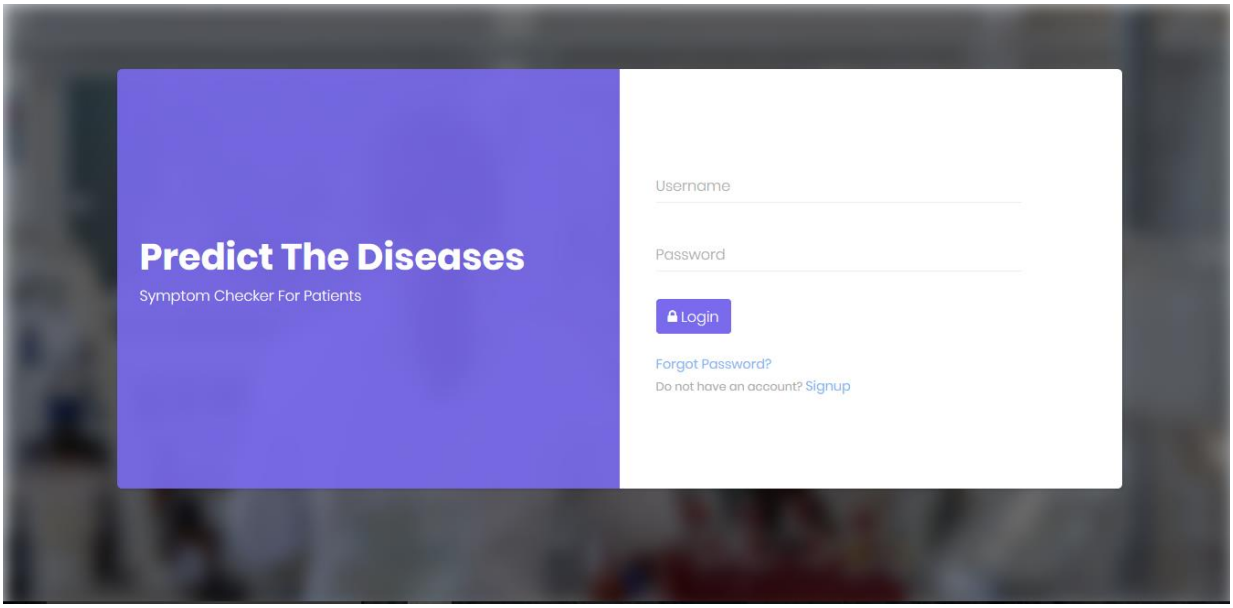


Figure 4.53: Doctor Log in Screen Interface

4.3.1.2 User Register

Process Name: User Register.

Purpose: To let patient and doctor to register for new account

Input: Username(username), Password(password), Confirm Password(confirm_password), Clinic Name(clinic_name), Clinic Address(clinic_address), Clinic State(clinic_state), Clinic City(clinic_city), Clinic Country(clinic_country), Clinic Mobile Number(clinic_mobileno), First Name(first_name), Last Name(last_name), Specialist(specialist), Age(age), Gender(gender), security question(security_question), answer(answer)

Output: User is registered and can login into the system.

Logic/Pseudo Code:

Step 1: Fill all information as all the fields are required. Also, user needs to follow the format of fields. If the user didn't meet the same format and information, user will not be able to register account.

Step 2: When the submit button is pressed then all the information will be inserted and stored in patient or doctor database respectively.

Step 3: When registration is successfully, user be able to login into the system using username and password that is registered.

Screen/Report Format:

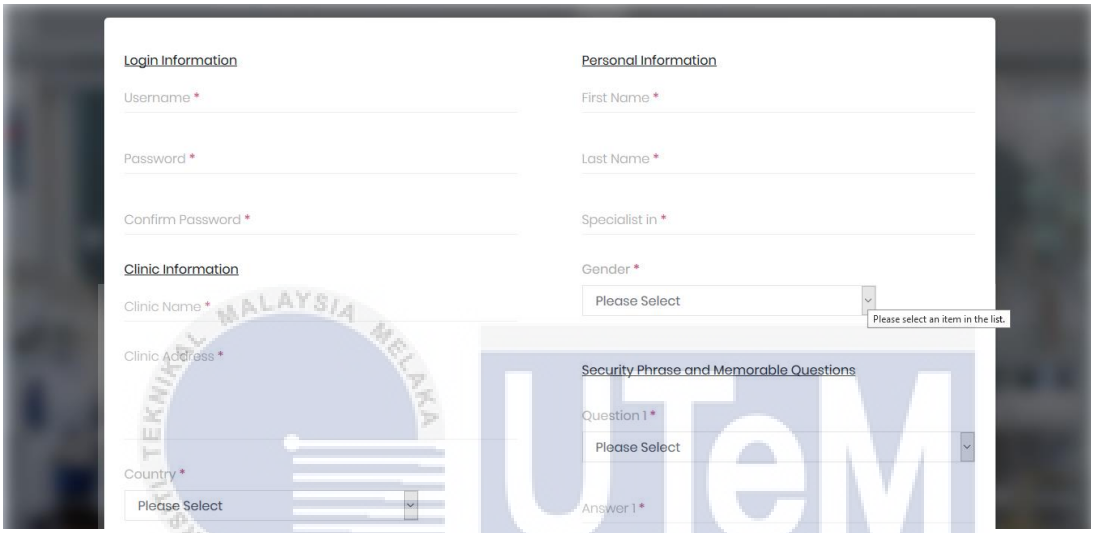


Figure 4.54: Doctor Register Screen Interface

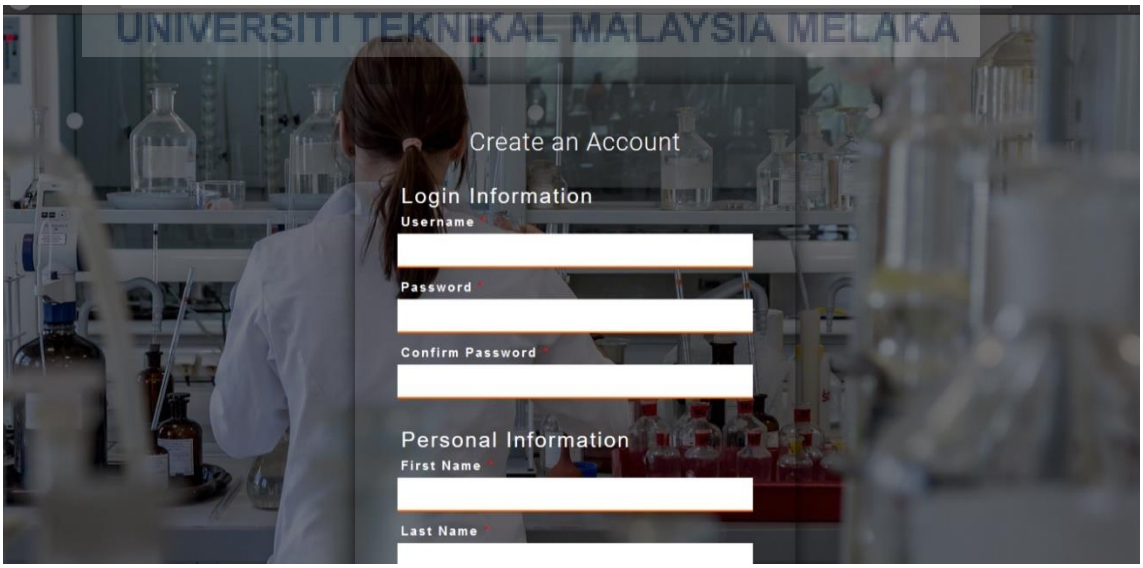


Figure 4.55: Patient Register Screen Interface

4.3.1.3 Disease Management

Process Name: New Disease.

Purpose: To let doctor add new disease that did not exist into the database.

Input: Disease Name(disease_name), Disease Description (disease_description)

Output: List of diseases detail.

Logic/Pseudo Code:

Step 1: Fill all information as all the fields are required.

Step 2: Click button Save or user can click button back for cancel the process.

Step 3: After that, disease that has been inserted will be displayed in the page view of diseases.

Screen/Report Format:

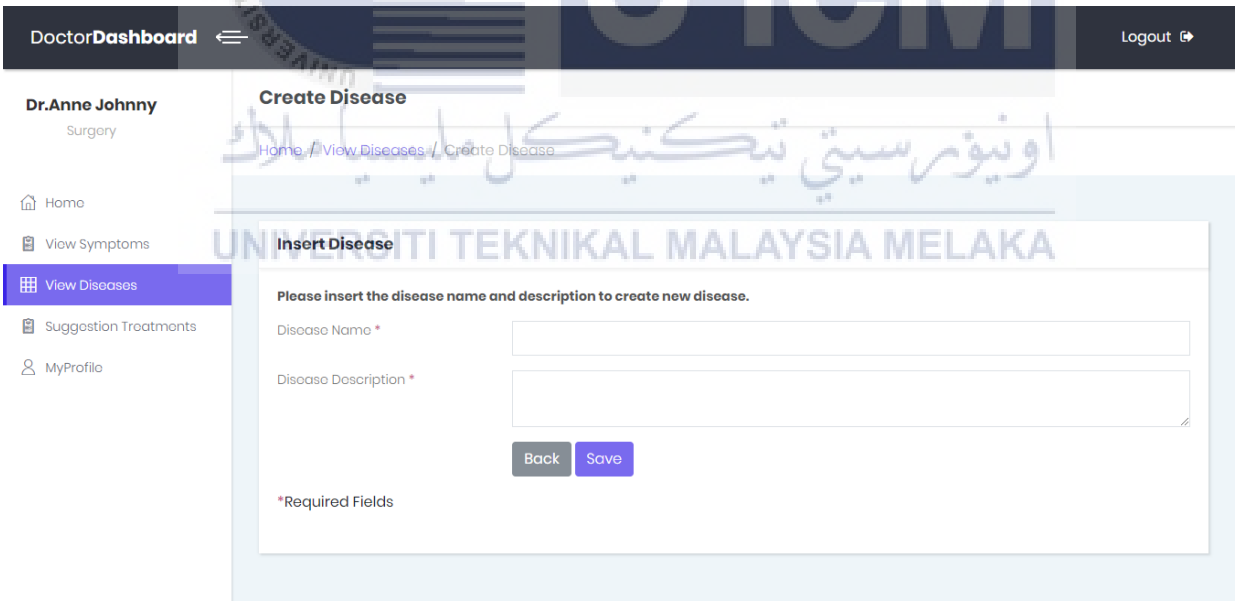


Figure 4.56: Disease Management Screen Interface

4.3.1.4 Symptom Management

Process Name: New Symptom.

Purpose: To let doctor add new symptom that did not exist into the database.

Input: Symptom Name(disease_name), Symptom Description (disease_description), Symptom Category(categories_symptom), Symptom Gender(gender_symptom), Body Part(bodypart_name), Symptom Name(symptom_name)

Output: List of symptoms detail.

Logic/Pseudo Code:

Step 1: Fill all information as all the fields are required.

Step 2: Click button Save or user can click button back for cancel the process.

Step 3: After that, symptom that has been inserted will be displayed in the page view of symptoms.

Screen/Report Format:

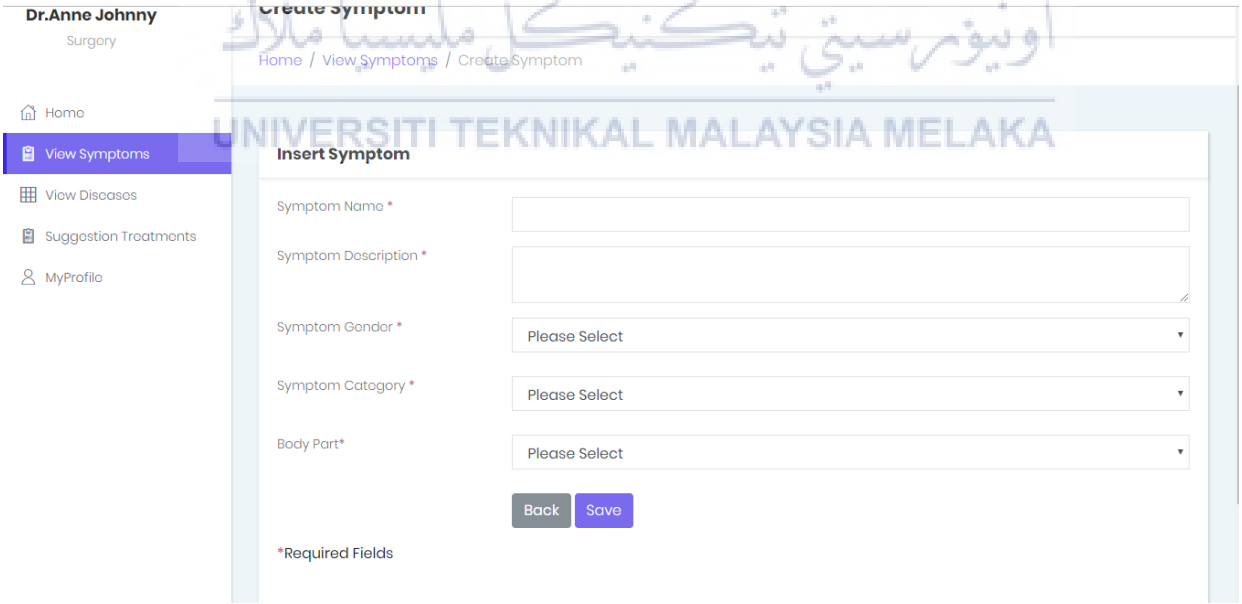


Figure 4.57: Symptom Management Screen Interface

4.3.1.5 Report of Statistic

Process Name: View Report of Statistic.

Purpose: To let patient and doctor can view report of statistic for any references. The report will be display in a bar graph of patient and doctor home page.

Input: Current Month(inDate)

Output: Report of statistic over the month.

Logic/Pseudo Code:

Step 1: User needs to choose the list of months in drop down menu to view the report.

Step 2: The system will process and display the report of statistic.

Screen/Report Format:

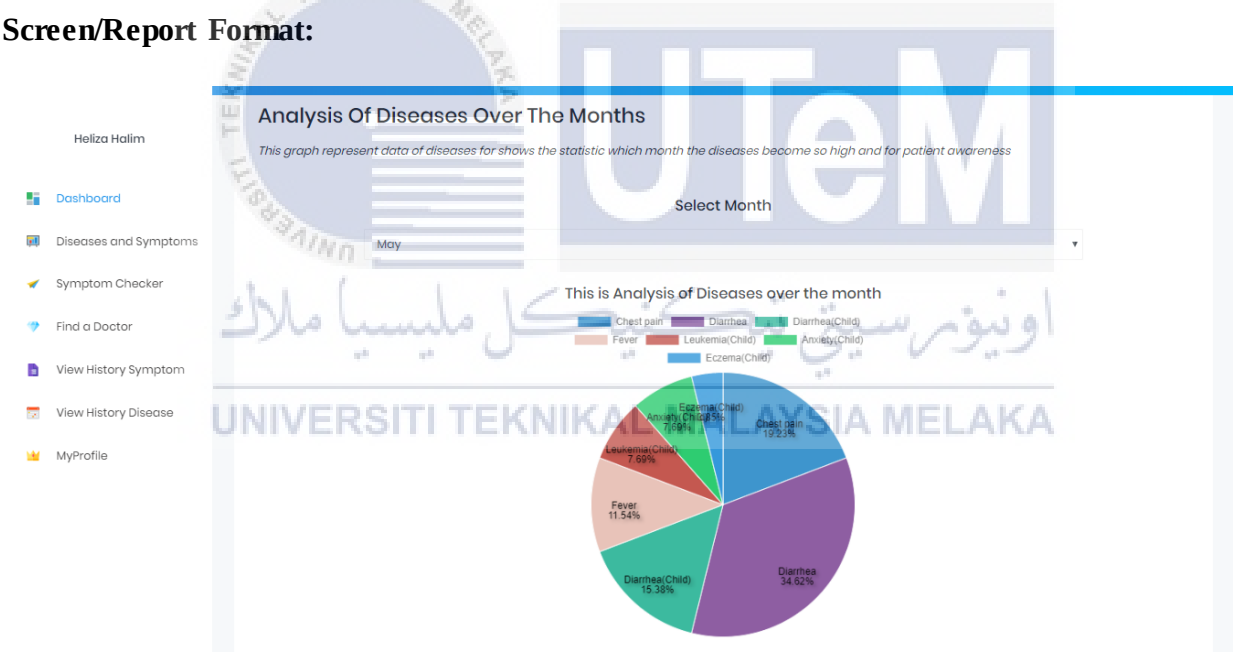


Figure 4.58: Report of Statistic Screen Interface

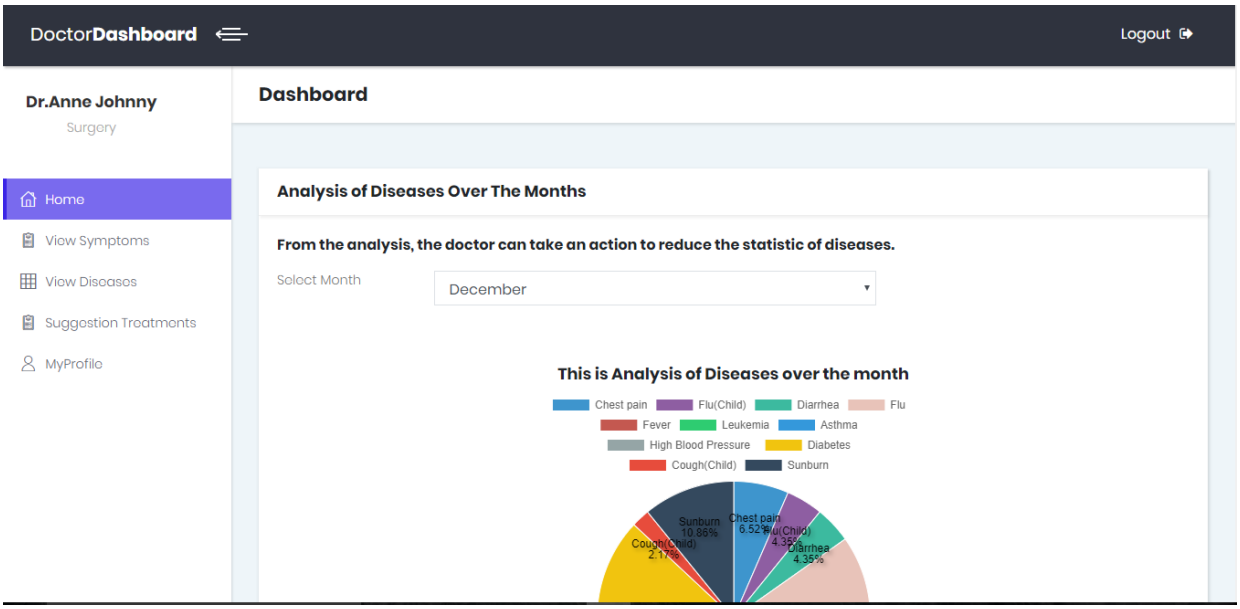


Figure 4.59: Report of Statistic Screen Interface

4.3.1.6 Symptom Checker

Process Name: Symptom Checker for instant diagnosis.

Purpose: To let patient select list of symptoms which is in checkbox to find the possible disease or cause.

Input: Symptom Category(category_symptom), Symptom Name(symptom_name)

Output: Possible disease.

Logic/Pseudo Code:

Step 1: Patient needs to select the symptom gender and symptom category which are male or female and adult symptoms or child symptoms.

Step 2: After select gender and category, the system will display list of symptoms that are categorized by body part.

Step 3: Patient must select at least two symptoms, but for more accurate result patient can select more symptoms.

Step 4: Click button Find Cause to get the result of possible disease or cause. The system will pop up a massage that look like modal style to display the possible disease or cause.

Screen/Report Format:

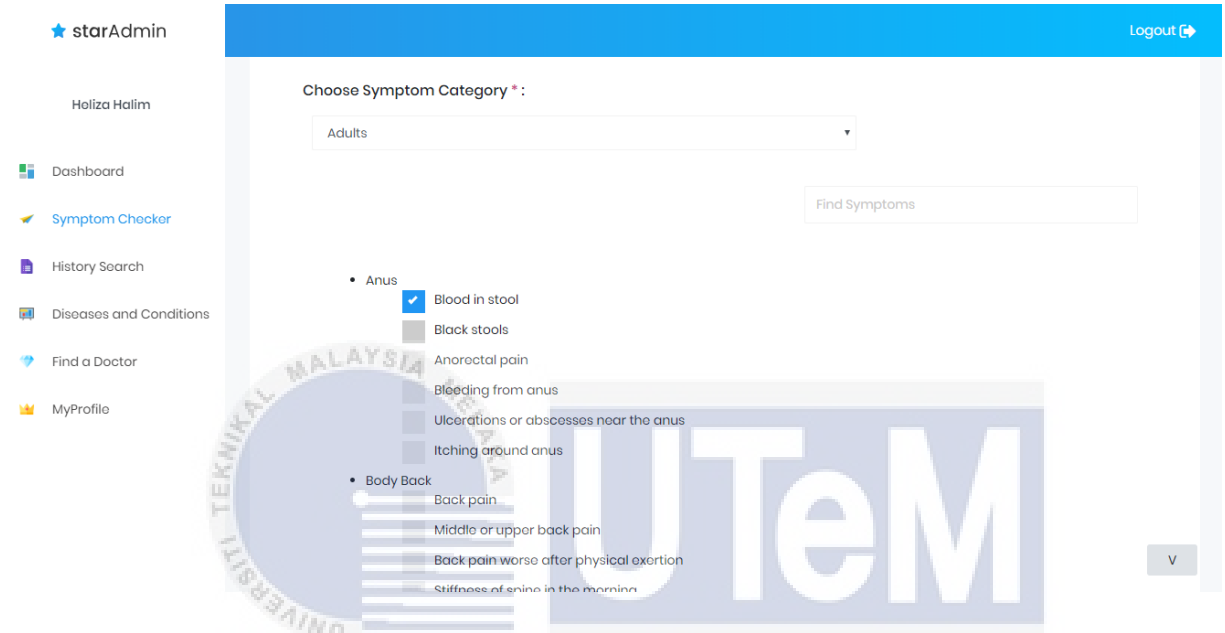


Figure 4.60: Symptom Checker Screen Interface

4.3.1.7 Find a Doctor

Process Name: Search doctor that available.

Purpose: To let patient find a doctor or specialist for real diagnosis.

Input: Doctor Name(doctor_name), Doctor Specialist(doctor_specialist), Clinic Location(clinic_location)

Output: List of available doctors

Logic/Pseudo Code:

Step 1: Patient needs to choose for searching by what category to easy and fast ways. There are three (3) options in the drop-down menu. First, search by doctor's name. Second search by doctor's specialist and the last one search by clinic's location.

Step 2: After the patient choose the search category, patient will insert the input or choose any options in drop down menu. Then the system will process and find the data in database.

Step 3: The system will display in a table the list of available doctors.

Step 4: The data that contains in the table are doctor's name, specialist, clinic name, clinic address and clinic mobile number.

Step 5: Patient can contact the clinic for more details

Screen/Report Format:

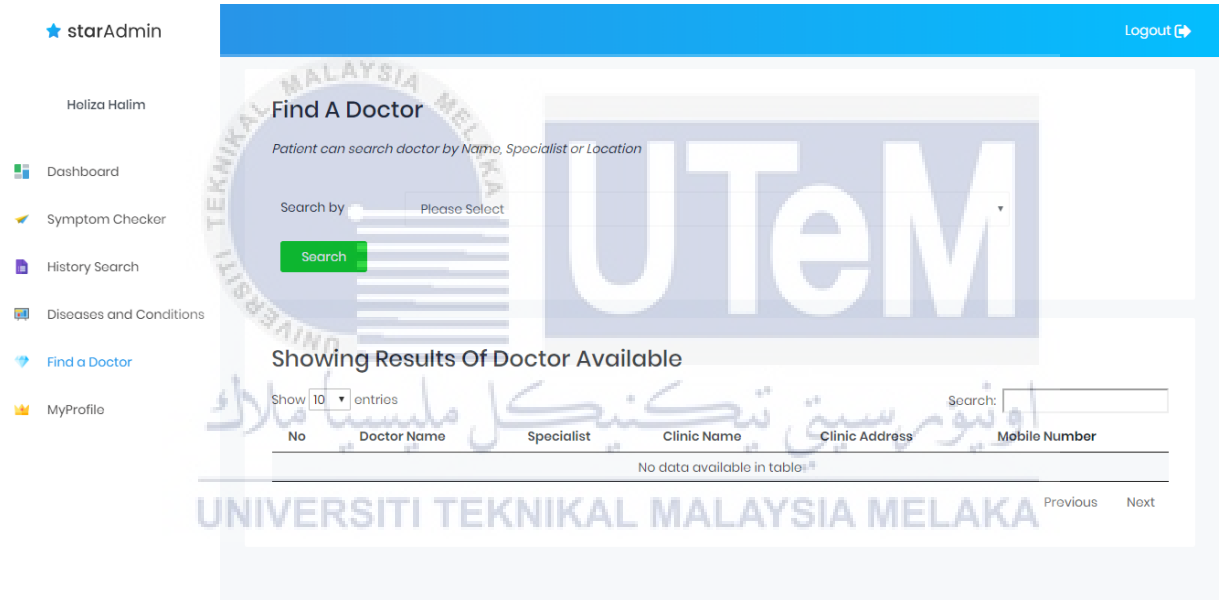


Figure 4.61: Find a Doctor Screen Interface

4.3.1.8 View History Symptom

Process Name: View history search of symptoms

Purpose: To let patient view the history search of symptoms for future references.

Input: Body Part(bodypart_name), Months(inDate)

Output: List of symptoms

Logic/Pseudo Code:

Step 1: Patient needs to select the list of months and list of body part for more specific filter.

Step 2: After that patient click button submit

Step 3: The system will display in a table the data of history search symptoms.

Screen/Report Format:

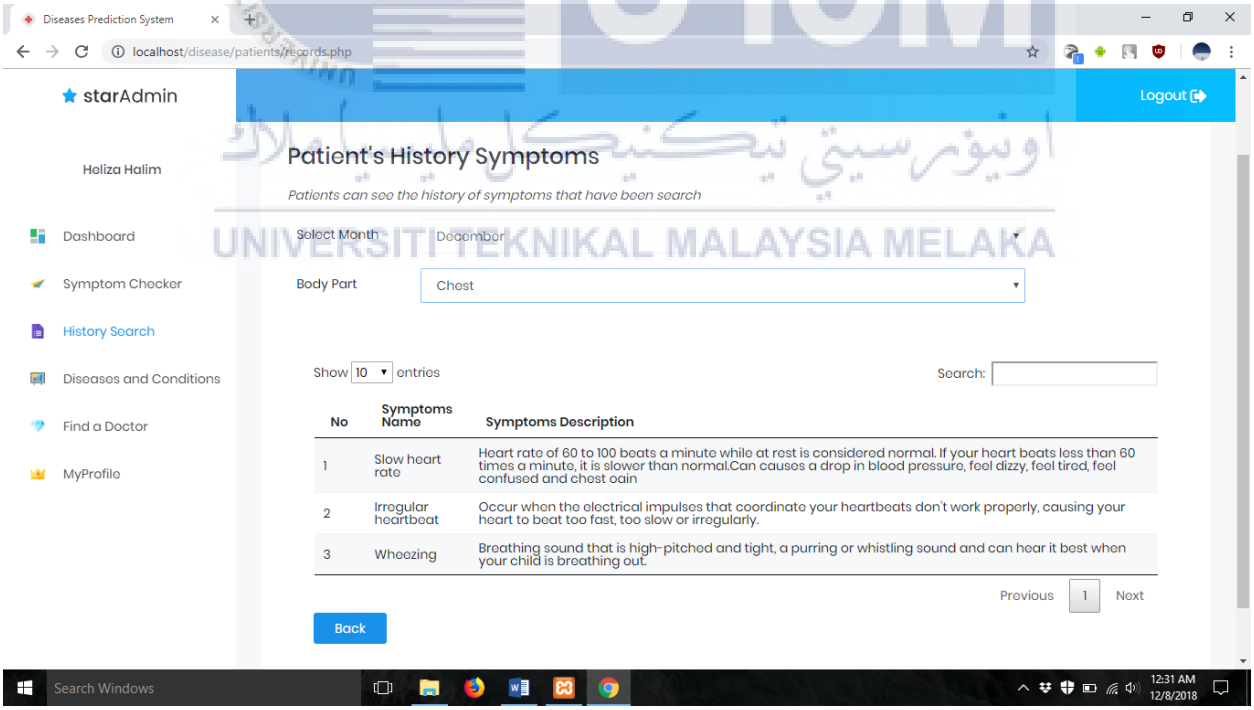


Figure 4.62: View History Symptom Screen Interface

4.3.1.9 View History Disease

Process Name: View history search of diseases

Purpose: To let patient view the history search of diseases for future references.

Input: Months(inDate)

Output: List of diseases

Logic/Pseudo Code:

Step 1: Patient needs to select the list of months for more specific filter.

Step 2: After that patient click button submit

Step 3: The system will display in a table the data of history search diseases.

Screen/Report Format:

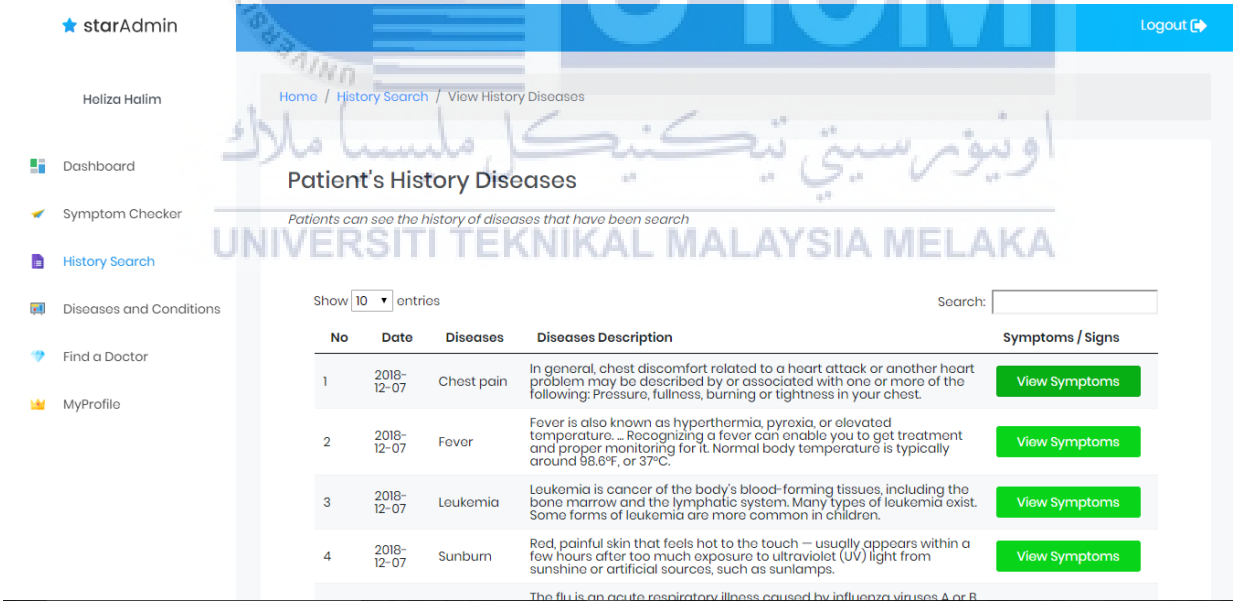


Figure 4.63: View History Disease Screen Interface

4.3.1.10 Update Profile

Process Name: Profile Information.

Purpose: To let doctor and patient update the profile information.

Input: First Name(first_name), Last Name(last_name), Age(age), Email(email), Clinic Name(clinic_name), Clinic Address(clinic_address), Clinic City(clinic_city), Clinic State(clinic_state)

Output: User profile update.

Logic/Pseudo Code:

Step 1: User have an option to update profile information. Also, user can read through all the personal information. The user can only view their own information.

Step 2: After filling up everything, user can click on save button to update the information.

Step 3: The information will be updated into the user information table.

Step 4: After the information has been updated, the user is redirect back to the profile information.

Screen/Report Format:

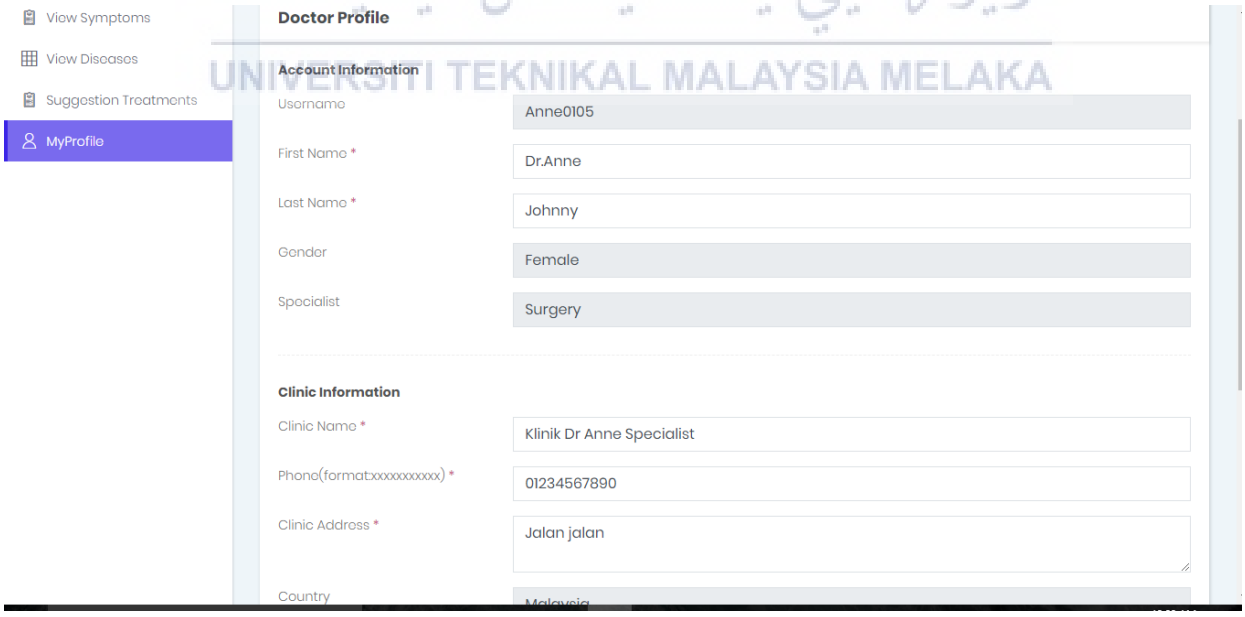


Figure 4.64: Doctor Update Profile Screen Interface

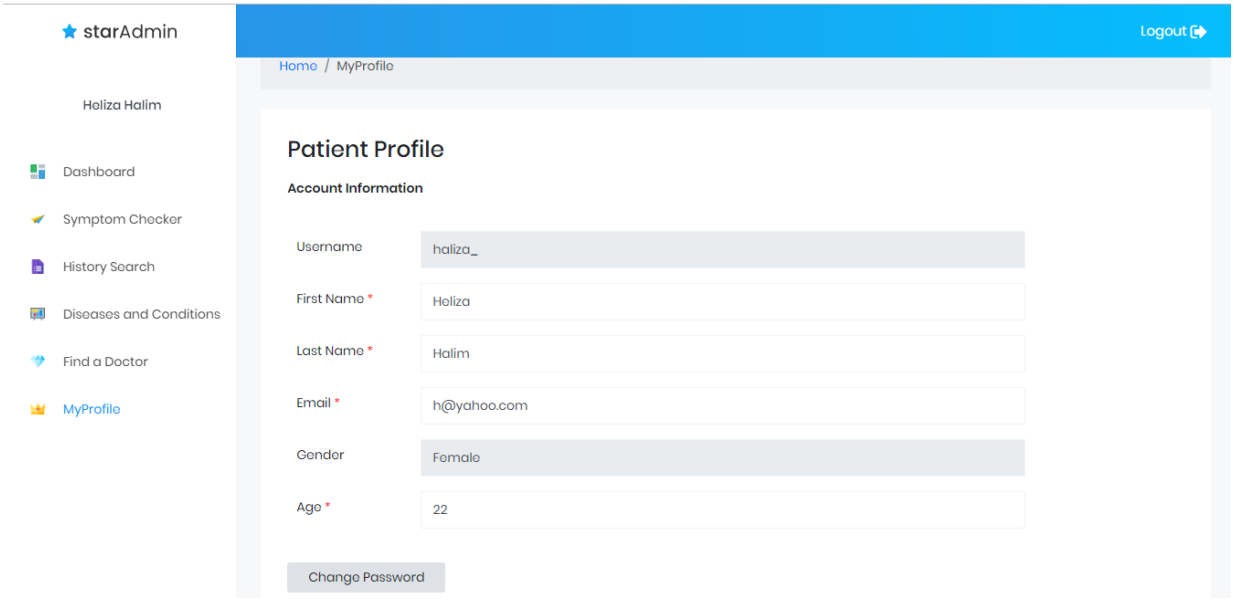


Figure 4.65: Patient Update Profile Screen Interface

4.3.2 Physical Database Design

In physical database configuration process, there is a stream that can change over the information accumulated amid the consistent plan stage into a depiction of physical database that are including tables and limitations. In this area, the security instrument will likewise be intricate as every one of the classes will be changed into physical plan which is information word reference in forbidden structures with test subtleties. In part of data dictionary, there are contents of attributes, description of attributes, data type, size, constraints, primary key, foreign key for each entity described will be identified.

4.3.2.1 Create table in database Diseases.

```
CREATE TABLE `patient` (
  `username` varchar(30) NOT NULL PRIMARY KEY,
  `firstName` varchar(50) NOT NULL,
  `lastName` varchar(50) NOT NULL,
  `password` varchar(50) NOT NULL,
  `gender` varchar(20) NOT NULL,
  `age` int(40) NOT NULL,
  `email` varchar(50) NOT NULL,
  `question1` varchar(20) NOT NULL,
  `answer1` varchar(50) NOT NULL,
  `question2` varchar(20) NOT NULL,
  `answer2` varchar(50) NOT NULL
)
```

Figure 4.66: Coding Create Table Patient

```
CREATE TABLE `doctor` (
  `username` varchar(30) NOT NULL PRIMARY KEY,
  `firstName` varchar(50) NOT NULL,
  `lastName` varchar(50) NOT NULL,
  `password` varchar(30) NOT NULL,
  `gender` varchar(20) NOT NULL,
  `specialist` varchar(30) NOT NULL,
  `clinicName` varchar(50) NOT NULL,
  `clinicAddress` varchar(50) NOT NULL,
  `clinicCity` varchar(20) NOT NULL,
  `clinicState` varchar(20) NOT NULL,
  `clinicCountry` varchar(20) NOT NULL,
  `clinicPhoneNo` varchar(30) NOT NULL,
  `email` varchar(40) NOT NULL,
  `question1` varchar(20) NOT NULL,
  `answer1` varchar(50) NOT NULL,
  `question2` varchar(20) NOT NULL,
  `answer2` varchar(50) NOT NULL
)
```


Figure 4.67: Coding Create Table Doctor

```
CREATE TABLE `symptom` (
  `SymptomId` int(30) NOT NULL PRIMARY KEY,
  `SymptomName` varchar(50) NOT NULL,
  `SymptomDescription` varchar(70) NOT NULL,
  `CategorySymptomId` int(30) NOT NULL,
  `BodyPartId` int(30) NOT NULL

)
```

Figure 4.68: Coding Create Table Symptom

```
CREATE TABLE `disease` (
  `DiseaseId` int(30) NOT NULL PRIMARY KEY,
  `DiseaseName` varchar(50) NOT NULL,
  `DiseaseDescription` varchar(70) NOT NULL
)
```

Figure 4.69: Coding Create Table Disease


```
CREATE TABLE `body_part` (
  `BodyPartId` int(30) NOT NULL PRIMARY KEY,
  `BodyPartName` varchar(50) NOT NULL,
)
```

Figure 4.70: Coding Create Table Body Part

```
CREATE TABLE `category_symptom` (
 `CategorySymptomId` int(30) NOT NULL PRIMARY KEY,
 `CategorySymptomName` varchar(50) NOT NULL,
)
```

Figure 4.71: Coding Create Table Category Symptom

```
CREATE TABLE `patient_symptom` (
 `UserNamePatient` varchar(30) NOT NULL PRIMARY KEY,
 `SymptomId` varchar(30) NOT NULL,
 `InDate` date NOT NULL,
 `DiseaseId` int(30) NOT NULL,
)
```

Figure 4.72: Coding Create Table Patient Symptom


```
CREATE TABLE `disease_symptom` (
 `DiseaseId` int(30) NOT NULL PRIMARY KEY,
 `SymptomId` varchar(30) NOT NULL,
 `probability` double NOT NULL
)
```

Figure 4.73: Coding Create Table Disease Symptom

Coding above shows the query to create table. This query implements into database to create another table with different attribute name, data type and size, null or not null and primary or foreign key.

4.3.2.2 Insert data into table Patient_Symptom.

```php
<?php
    require_once '../config/config.php';
    header("Content-type: application/json");
    session_start();
    if (isset($_POST['disease'])) {
        $symptoms = array();
        $symptoms = $_POST['disease'];
        $symptomId = array();

        $result = mysqli_fetch_assoc($res);

        $date = date("Y/m/d");
        foreach ($symptomId as $symptom) {
            $sql2 = mysqli_query($con, "INSERT INTO patient_symptom (username, symptomId, inDate, diseaseId)
            VALUES ('".$_SESSION['username']."', '$symptom', '$date', '".$result['diseaseId']."')");
        }

        echo json_encode($result);
```

Figure 4.74: Coding Insert Data Table Patient_Symptom

Figure above shows the query to insert data into the table Patient_Symptom. The user which is patient can select list of symptom and then the system will store the data into the table Patient_Symptom. The data that will be store are patient's username, symptom, disease and the current date.

4.3.2.3 Update data in table Disease.

```php
include '../config/config.php';
$strSQL = "SELECT * FROM doctor WHERE username = '".$_SESSION['username']."' ";
$objQuery = mysqli_query($con,$strSQL);
$objResult = mysqli_fetch_array($objQuery);
if(!$objResult)
{
    echo "Not found userID=".$_SESSION["username"];
}
else
{
}
$strdiseaseId = $_POST["diseaseId"];
$diseaseName = $_POST["diseaseName"];
$diseaseDesc = $_POST["diseaseDesc"];

$Query= "UPDATE disease SET diseaseName ='$diseaseName',diseaseDesc ='$diseaseDesc',
username= '".$_SESSION['username']."' WHERE diseaseId = '$strdiseaseId'";
$strQuery =mysqli_query($con,$Query);
if (!$strQuery) {
    echo 'MySQL Error: ' . mysqli_error($con);
    exit;
}
else
{
        mysqli_commit($con);
            echo "<script>alert('You have successfully UPDATED disease details.');";
        echo "window.location.href = '../doctor/viewDiseases.php';</script>";

        exit;
}
?>
```

Figure 4.75: Coding Update Data Table Disease

Figure above shows the query to update the data in table Disease. The doctor only can update the disease details which is disease's name and disease's description.

4.3.2.4 Login into the system

```
function sanitizeString($var)
{
    $var = stripslashes($var);
    $var = htmlentities($var);
    $var = strip_tags($var);
    return $var;
}
if (isset($_POST['username']))
{
    $username = sanitizeString($_POST['username']);
    $password = sanitizeString($_POST['password']);

    if ($username == "" || $password == "")
    {
        echo "<script>alert('Please insert your Username and Password');";
            echo "window.location.href = '../patients/login.php';</script>";
    }
    else
    {

        //user
        $query = "SELECT password FROM patient WHERE username ='$username' LIMIT 1";
        $result = mysqli_query($con, $query) or exit("The query could not be performed");
        $result2 = mysqli_fetch_assoc($result);

        if (mysqli_num_rows($result) == 1 && password_verify($password, $result2['password']))
        {
        $_SESSION["username"] = $username;
        $_SESSION["password"] = $password;
            header ("location:../patients/index.php");
        }
        else
        {
            echo "<script>alert('Login failed. Username or Password is invalid');";
            echo "window.location.href = '../patients/login.php';</script>";
            exit;

        }
    }
```

Figure 4.76: Coding Login System

Figure above shows the technique which is control statement that has been used in implementation. The control statement is implemented in the login section. The doctor or patient will login into respective page according to the window location. Before that, the system will validate either the username is valid or not in database. If the username and password is valid the user will log in into the patient or doctor page.

4.3.2.4 View data to find a doctor.

```php
<?php
include '../config/config.php';
header("Content-type: application/json");
if (isset($_POST['doctorName'])) {
    $name = $_POST['doctorName'];
    $sql = mysqli_query($con, "SELECT * FROM doctor WHERE firstName like '%$name%'");
    $rows = array();
    while($r = mysqli_fetch_assoc($sql)) {
        $rows[] = $r;
    }
    echo json_encode($rows);
} else if (isset($_POST['category'])) {
    $category = $_POST['category'];
    $sql = mysqli_query($con, "SELECT * FROM doctor WHERE specialist = '$category'");
    $rows = array();
    while($r = mysqli_fetch_assoc($sql)) {
        $rows[] = $r;
    }
    echo json_encode($rows);
} else if (isset($_POST['location'])) {
    $location = $_POST['location'];
    $sql = mysqli_query($con, "SELECT * FROM doctor WHERE clinicCity = '$location'");
    $rows = array();
    while($r = mysqli_fetch_assoc($sql)) {
        $rows[] = $r;
    }
    echo json_encode($rows);
}
?>
```

Figure 4.77: Coding Find a Doctor

Figure above shows the query for selection to retrieve information from database tables. The query wants to retrieve the clinic information and doctor information from table according to the condition that input by the patients.

4.4 Conclusion

This chapter has set out how to implement the Web Based Diseases Prediction System in light of the database structure and the module plan. Database configuration depicts the business stream in the system utilizing the ERD. Module configuration demonstrates the draft of screen structure that ought to be worked in this system. Also, in this section had been discussed high-level design which are the elements such as the system architecture, user interface and database design have been created that will guide to establish the system. In next chapter, the implementation phase will be discussed.

CHAPTER V

IMPLEMENTATION

5.1 Introduction

This section will be discussing the implementation of the system. The aim of implementation phase is to produce the new system available by defining how the information and data should be develop. Besides, the motivation behind execution is to change over last physical system particular into working and dependable programming as this segment is imperative to construct a system. There are three (3) phases in the implementation of Web Based Disease Prediction System which are System Development Environment (SDE), System Configuration Management (SCM) and Implementation Status (IS). After the implementation, the system can be arranged whether this system is connected with client prerequisite or not. Besides, this system incorporates the physical plan of condition, the server arrangement and the database setup.

5.2 Software Development Environment Setup

In this section, to characterize the product condition setup, organization chart has appear underneath to speak to the product condition engineering of Web Based Diseases Predication System.

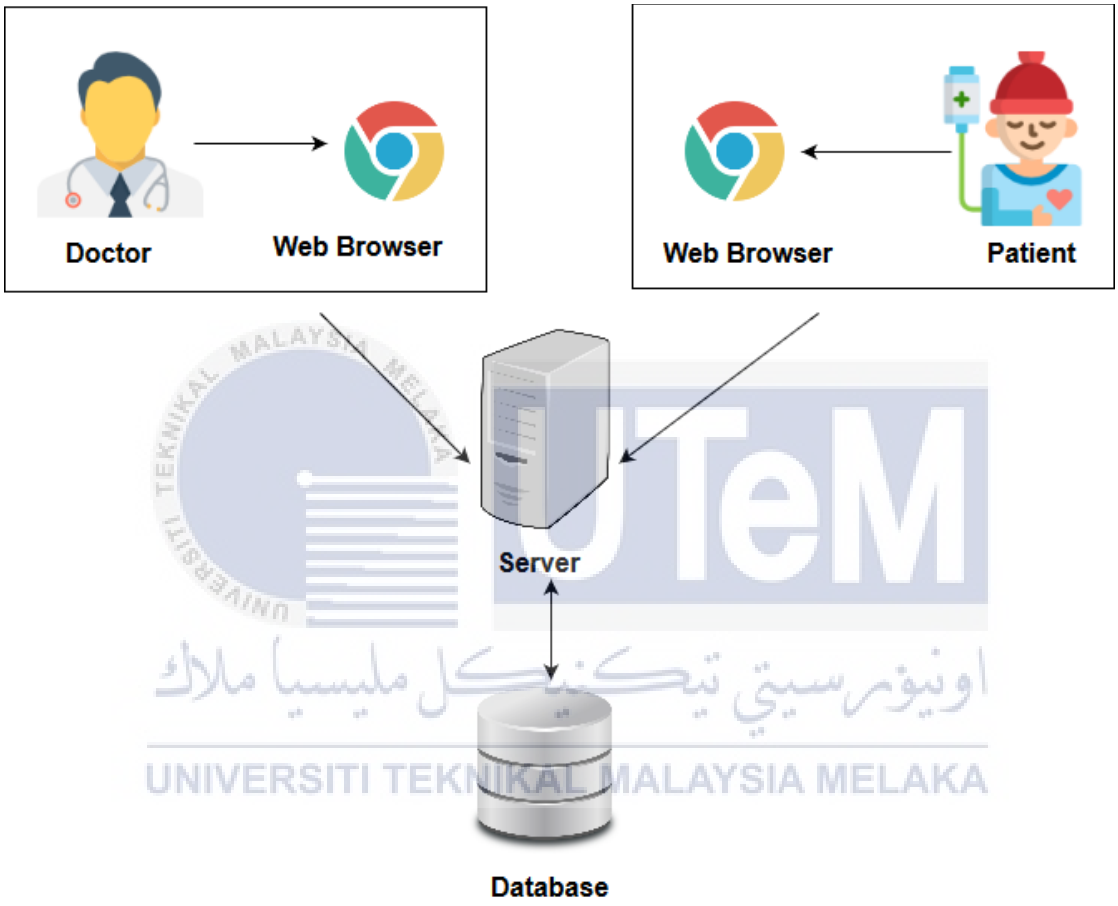


Figure 5.0: Deployment Diagram

Hardware, software and network configuration are including in software development environment. Web Based Diseases Prediction System is a web application which uses notepad++ to write necessaries code such as HTML, PHP and JavaScript language. Besides, MySQL as a storage of data for the proposed system and use as platform along with XAMPP server to allow Web Based Diseases Prediction System to be integrated within system and server. Thus, the system could be implemented.

Table 5.0: Hardware Configuration

Item	Requirement	Minimum Configuration
Vostro 15 5000	Processor	Intel(R) Core™ i5-3210M CPU @ 250GHz 2.50GHz
	RAM	4GB
	System Type	64-bit Operating System

5.3 Software Configuration Management

In procedure of an execution, there are programming setup that should be done before beginning the undertaking as guarantee that the task can run easily with no abandonment. Consequently, the software been utilized to build up the framework are designed. Coming up next are the essential setup of the software:

i. XAMPP

1. Download XAMPP from Apache Friends website.
2. Run installer.
3. Accept default setting.
4. Wait for installation to finish.
5. Run XAMPP.
6. Start Apache and MySQL.

ii. NOTEPAD++ TEXT

1. Download Notepad++ from Notepad Plus Plus website.
2. Run installer.
3. Select install.
4. Wait for installation to finish
5. Run Notepad++.

5.3.1 Configuration Environment Setup

i. Server Configuration

For server configuration, the SQL is uploaded in Infinity Free, which is free webhosting website in internet.

ii. Database Configuration

For database configuration, phpMyAdmin is used in Infinity web hosting and is using SQL.

iii. Client Configuration

The client setup is about the user ready to connect the site since the records is transferred in web facilitating server.

5.3.2 Version Control Procedure

A rendition control strategy is an assistance to ensure that system up and coming, while at the same time furnishing designers with great estimation of the framework or programming. Likewise, adaptation control is utilized by programming engineers to put source code in a focal place and track diverse forms of codes. It has been characterized to control the framework advancement and testing by utilizing adaptation. After the primary source code has been totally created, Web Based Diseases Prediction System is put under the adaptation control technique. The usefulness of the system will be refreshed dependent on the user's criticism.

Table 5.1: Version Control Procedure

Version	Description
UCSv.01	The form just perspectives the framework route stream and the interface plan.
UCSv.02	This adaptation is made for unit testing and incorporates some portion of framework modules.
UCSv.03	The upgrade of past variant with more modules included. Besides, framework designers will address mistakes that the analyzers distinguish from past framework.
UCSv.04	The last and full form of the framework. All tests are improved the situation all modules including mistake dealing with. The framework is completely working.

5.3.4 Symptom Checker Configuration

Figure below shows the implementation of the possible diseases features that will display in module of symptom checker. This features to identify the possible diseases based on symptoms high similarity. The process is two symptoms that user select from the symptom checkbox in the system will be stored in array_push because insert more than two elements to the end of an array. After that, the Id of symptom will be sort and sent into json_encode and

then will be read using implode because it is using array. To view more possible diseases, developer will implement the while loop in the php code and using foreach php.

symptomsApi.php

```
5   if (isset($_POST['disease'])) {
6       $symptoms = array();
7       $symptoms = $_POST['disease'];
8       $symptomId = array();
9       foreach ($symptoms as $symptom) {
10          $sql = mysqli_query($con, "SELECT symptomId FROM symptom
            WHERE symptomName = '$symptom'");
11          if (!$sql) {
12              printf("Error: %s\n", mysqli_error($con));
13              exit();
14          }
15          $id = mysqli_fetch_array($sql);
16          if ($id != NULL) {
17              array_push($symptomId, $id[0]);
18          } else {
19          }
20      }
21      sort($symptomId);
22      $symp = trim(json_encode($symptomId),'[]');
23      $sql2 = "SELECT dg.diseaseId, dg.disease, dg.probability FROM
        (SELECT d.diseaseId, d.diseaseName AS disease,
        GROUP_CONCAT(DISTINCT ds.symptomId ORDER BY ds.symptomId ASC
        SEPARATOR ',') as dn, sum(ds.probability) AS probability FROM
        disease d, disease_symptom ds WHERE d.diseaseId = ds.diseaseId
        AND ds.symptomId IN ($symp) GROUP BY d.diseaseName ORDER BY
        sum(ds.probability) DESC) dg WHERE dg.dn = '".implode(",",
        $symptomId)."'";
24
25      $res = mysqli_query($con, $sql2);
26
27      if (!$res) {
28          printf("Error: %s\n", mysqli_error($con));
29          exit();
30      }
31      $dis = "";
```


Figure 5.1: Symptom Checker Configuration

5.4 Implementation Status

This area clarifies about the subtleties of to what extent the usage of every module that require information contribution to be done as following:

Table 5.2: Implementation Status

Module	Description	Duration (week)	Size (%)
Interface design	Design user interface	2	5
Database design	Develop database	1	5
User verification	Develop login module to verify the users login	1	5
New symptom	Develop the coding to make new symptoms data	1	5
New disease	Develop the coding to make new diseases data	1	5
New suggestion treatment	Develop the coding to make new treatment data	1	5
Match treatments and disease	Develop the coding to match treatments data with a disease	1	10
Match symptoms and disease	Develop the coding to match symptoms data with a disease	1	10
Symptom checker	Develop the coding to find possible diseases based on patient select in the list of symptoms	10	20

Graph statistic	Develop the coding to view statistic of diseases	1	5
Search doctor	Develop the coding to search the available doctor for real diagnosis	1	5
Redesign database	Develop the coding to redesign database.	1	5
Redesign interface	Develop the coding to redesign the interface	1	5
Edit disease	Develop the coding to update disease details	1	5
Edit symptom	Develop the coding to update symptom details	1	5
History symptom	Develop the coding to view history search of symptoms	1	5
History disease	Develop the coding to view history search of diseases	1	5
Change password	Develop the coding to change password	1	5

5.5 Conclusion

In a nutshell, it can be concluded that implementation stage is a very crucial stage in the software development life cycle as it involves in getting the software well functioned in correctly and properly manners in its environment including during installation, configuration, testing and modification made to the system. An appropriate implementation is chosen will shorten the time needed for implementation as well as reduce the risk for having more budgets for overcome the errors and fault occurs which results from inappropriate method used.

CHAPTER VI

TESTING

6.1 Introduction

Chapter 6 is going to discuss and explain on the testing tasks, that testing is the last phase of the Web Based Diseases Prediction System development. Test analyst or tester will play main role in this phase where both roles will do some activity to test the system to ensure that the system meet and gain the objectives and user's requirements that called testing phase. Also, testing phase is one part in implement a system whereas it is must examine the quality of system and need to ensure the system quality is increase. In addition, by examine the system to find the errors or bugs and verify the system is fit to be use by user, are get from the test approach that is the process of executing the system, hence the system can fulfill the objective of project. In testing phase, developer must meet user's requirements that can guide in design and develop the system. Also, the system needs to function within an acceptable time and respond correctly to all kinds of inputs. The testing strategy and document all result and agenda that will be performed by test analyst or tester will be provided in this phase as it is the main objective of the phase.

6.2 Test Plan

The section whereas is a basic test plan for testing a system that have been develop that called test plan. This test plan is dividing into four test that need to check which is consists of the scope of project, the approach, the resources and the timetable schedule. Besides, testing plan consists three major test phases that are namely as the organization, the environment and the schedule. By giving developer to allocate the required resources such as space and time, which is duration during develop the system, also stated in the testing plan. For Web Based Disease Prediction System, patient and doctor are the target users that involve in the test organization. The environment which is the place for the system to be test and set up all equipment for testing is called test environment. Lastly, to ensure the testing activities that will be carry out is complete on the time, there is a timetable to be using to manage the system testing.

6.2.1 Test Organization

Test organization is stand from organization of testers for the system. Testers is a person that carry out the testing activities and tester have responsible to do testing on each modules of the system, hence it is significant to choose right person in this test. To achieve great credibility on the result of testing need to undergo the independent testing. Besides, tester that involve with programming team can find more errors or bugs that called independent tester. Furthermore, the person that able to produce more accurate results of testing with the open-minded is called independent tester. Therefore, to develop a successful project, it is very significant to undergo independent testing. The environment of real-life testing and quick testing are performed for the testing of Web Based Diseases Prediction System. Patient and doctor are involved as tester in quick testing while for real life testing will involve Mr. Muhammad Suhaizan Bin Sulong. The organization will confirm the choose of task is being done effectively. The project test organization is explained by table below.

Table 6.0: Role Involve in Testing Phase

Tester ID	Responsibilities	Role
Tester 01	• Developer / Programmer • Embroiled in unit of integration testing and the successful of system development • Determine the technical feasibility of the system • Revise and examine on testing results and make necessary changes on source code	Hanani Binti Mohamad Idris
Tester 02	• Supervisor • User acceptance test to evaluate the performance of the program • Record the testing result • Do retest if necessary • Provide valuable comments and critics after testing the system	Mr. Muhammad Suhaizan Bin Sulong
Tester 03	• Patient and Doctor • Ensure the programmer perform the test and remark the test process • Provide valuable comments and critics after testing the system	Patient and Doctor

6.2.2 Test Environment

There are three things that the library needs to disparate from the development area which are version control, database space and partition, this is called as function of test environment. To examine the task that include testing is done in correctly or not, testing environment will be done in development environment. Furthermore, it can deliver flexibility in project and sustain the integrity of code.

Software and hardware that are used to carry out the testing are:

i. Software

- Notepad++
- PhpMyAdmin and MySQL

ii. Hardware

Table 6.1: List of Hardware

Specification(server)	**Specification(client)**
Windows 10	Windows 10
Processor	7th Generation Intel Core i5 Processor
Keyboard, Mouse	Keyboard, Mouse
Google chrome & Mozilla Firefox	Google chrome & Mozilla Firefox
Wide Area Network	Wide Area Network
Laptop Dell	Laptop Dell

6.2.3 Test Schedule

There are four stages, that contains in the testing schedule. The stages are unit testing, integration testing, system testing and acceptance testing. The testing tasks or activities that have been done in prescribed time is explain in testing schedule. Thus, to perform and to run a good testing, the test schedule must be plan in order so that the testing is well organize and can be carried out on time.

Table 6.2: Test Schedule

Testing Activities	Description	Duration
Unit Testing	To examine the module of system is meets user's requirements	21 Days
Integration Testing	To examine the module of system can run well after integrated	28 Days
System Testing	To examine the system can run in a proper way in the deployed environment	7 Days
User Acceptance Testing	To examine the deployed system can fulfill the user needs and insights	7 Days

The testing schedule's activity are identified as below:

Table 6.3: Test Schedule Specification for Doctor

Modules/ Components	Test Cases/ Strategy	Duration/ Cycles	Start Date	End Date
Login Form	Unit, Integration, User Acceptance	2 days/5 times	26 Mac 2018	28 Mac 2018
Manage Symptom	Unit, Integration, User Acceptance	9 days/7 times	29 Mac 2018	7 April 2018

Manage Disease	Unit, Integration, User Acceptance	9 days/ 5 times	8 April 2018	16 April 2018
Report Statistic	Unit, Integration, User Acceptance	16 days/7 times	17 April 2018	3 May 2018
Recovery Password	Unit, Integration, User Acceptance	6 days/5 times	4 May 2018	10 May 2018
Manage Treatment	Unit, Integration, User Acceptance	9 days/7 times	12 November 2018	20 November 2018
Add Category Symptom	Unit, Integration, User Acceptance	16 days/7 times	21 November 2018	6 December 2018

Table 6.4: Test Schedule Specification for Patient

Modules/ Components	**Test Cases/ Strategy**	**Duration/ Cycles**	**Start Date**	**End Date**
Login Form	Unit, Integration, User Acceptance	2 days/5 times	26 Mac 2018	28 Mac 2018
Symptom Checker	Unit, Integration, User Acceptance	14 days/5 times	29 Mac 2018	14 April 2018
View History Symptom	Unit, Integration, User Acceptance	4 days/ 5 times	15 April 2018	19 April 2018
View History Disease	Unit, Integration, User Acceptance	4 days/ 5 times	20 April 2018	24 April 2018
Report Statistic	Unit, Integration, User Acceptance	6 days/7 times	25 April 2018	1 May 2018
Recovery Password	Unit, Integration, User Acceptance	4 days/5 times	2 May 2018	6 May 2018
Check Symptom Checker Category	Unit, Integration, User Acceptance	9 days/5 times	7 December 2018	15 December 2018
Check Possible Diseases	Unit, Integration, User Acceptance	25 days/4 times	1 October 2018	25 October 2018

View Suggestion Treatment	Unit, Integration, User Acceptance	6 days/7 times	16 December 2018	21 December 2018

6.3 Test Strategy

Black box and white box will be used in the testing strategy. To examine the functionality of the system in the main testing strategy used the black box test. The process of black box is it will approach of testing that examine the system functionality with lack of knowing about the system internal structure. The tester or test analyst that will undergo the testing strategy does not required programming knowledge. The function of system modules is regularly checked, when black box test is implemented in test of unit, integration, system and acceptance. Thus, the system can meet the user's requirements. Meanwhile, testing that deals with logic of internal and code's structure is called white box test. The test analyst or tester must have knowledge of programming and logic, because need to deals with the code. The test analyst or tester have privileges to the structure of internal data and the algorithms of code that implemented in the system.

6.3.1 Testing Class

To evaluate the system attributes and system capabilities in Web Based Disease Prediction System, that the class of testing will be used. Also, need to ensure that the testing activities are achieve and meet the result of actual.

6.3.1.1 Unit Test

Developer needs to test the code that have been develop and must ensure that the functions of system are run smoothly, this are referred to unit test. In another name, it is called as white box test. Tester must ensure that the units of system reliability are meet the user's requirements. The tester can perform only testing on function of system module because the developer only creates particular module and mobile apps from requirements of functional. The system needs

real data to test the algorithm of system and to insert into database. Table A.1 in Appendix A shows the description of each testing case.

6.3.1.2 Integration Test

The purpose of integration test is to establish that each module in the system can run properly. The test to examine the parameter and data that will be passed into the system and function of system. Also, this test will check and examine the interaction of system is run smoothly, thus can meet the user's requirement.

Table 6.5: Test Result and Analysis for Login

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1001	Test Data1	**Valid Input** Condition: Enter the valid username and password	User login successful	OK
	Test Data2	**Invalid Input** Condition: Enter the invalid username and password	User login failed because invalid username and password. Eg. buku	OK
	Test Data3	**Invalid Input** Condition: User not fill username and password form	Display pop up error message	OK

Table 6.6: Test Result and Analysis for Create Disease

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1002	Test Data1	**Valid Input** Condition: Insert data with correct format	Disease data successfully inserted	OK
	Test Data2	**Invalid Input** Condition: Insert data with invalid format	Data inserted failed. Eg Disease Name but the doctor insert number value	OK
	Test Data3	**Invalid Input** Condition: User not fill disease name and disease description form	Display form must not be blank message	OK

Table 6.7: Test Result and Analysis for Create Symptom

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1003	Test Data1	**Valid Input** Condition: Insert data with correct format	Symptom data successfully inserted	OK
	Test Data2	**Invalid Input** Condition: Insert data with invalid format	Data insert failed. Eg Symptom Name but the doctor insert number value	OK
	Test Data3	**Invalid Input** Condition: Did not fill in symptom name, body part, symptom category, symptom	Display form must not be blank message	OK

		gender and symptom description form		

Table 6.8: Test Result and Analysis for Match Symptoms and Disease

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1004	Test Data1	**Valid Input** Condition: Select data from dropdown menu	Symptom data successfully inserted for a disease	OK
	Test Data2	**Invalid Input** Condition: Insert redundant data which is user insert same symptomId two times.	Data inserted failed. Eg: Data already inserted.	OK
	Test Data3	**Invalid Input** Condition: Did not select data	Display form must not be blank message	OK

Table 6.9: Test Result and Analysis for View History Symptom

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1005	Test Data1	**Valid Input** Condition: Select data from dropdown menu, month and body part	Symptom data successfully display	OK
	Test Data2	**Invalid Input** Condition: Select data that not correct	No data display. Eg not select the right data. Only select	OK

			one drop down menu.	
	Test Data3	**Invalid Input** Condition: Did not select data	Display form must not be blank message	OK

Table 6.10: Test Result and Analysis for Symptom Checker

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1006	Test Data1	**Valid Input** Condition: Select at least two symptoms for more accurate output	Similarity symptom data successfully display with possible diseases	FAIL- The output of possible diseases is pop up, but the result is not accurate as the system unable to commit the changes of applying SQL statement which has been tested in MYSQL server
	Test Data2	**Invalid Input** Condition: Select only one symptom	Alert pop up for user to select at least two symptoms	OK
	Test Data3	**Invalid Input** Condition: Did not select data	No action	OK

Table 6.11: Test Result and Analysis for Create Treatment

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1007	Test Data1	**Valid Input** Condition: Insert data with correct format	Symptom data successfully inserted	OK
	Test Data2	**Invalid Input** Condition: Fill the form with invalid format	Data inserted failed. Eg Treatment Name but the doctor insert number value	OK
	Test Data3	**Invalid Input** Condition: Did not fill in treatment name and treatment description	Display form must not be blank message	OK

Table 6.12: Test Result and Analysis for Match Treatments and Disease

Test Case ID	Column Name	Action	Result	Pass Initials (OK/FAIL)
PRS_01_1008	Test Data1	**Valid Input** Condition: Select data from dropdown menu treatments and for each disease	Symptom data successfully inserted for a disease	OK
	Test Data2	**Invalid Input** Condition: Select data that not correct	Data inserted failed. Eg not select the right data	OK
	Test Data3	**Invalid Input** Condition: Did not select data	Display form must not be blank message	OK

6.3.1.3 System Test

By carry out the system test is to ensure the system can run smoothly and function correctly and for the system that received the data from user can be processed accurately. Also, the system test to examine the performance of system whether it is run optimally even in unusual condition.

6.3.1.4 User Acceptance Test

To conduct the user acceptance test for ensure that the user can interact with the system smoothly and satisfy the user's needs and insights. To confirm the acceptability of system is need the activities from end-user to be review and re-check the test cases of preview. In this phase, ensure each function of system is run well and fulfill user's requirements, which is by promote the benefits of system so that user feel confident to use the system. In user acceptance test, the user's requirements need to be verified by tester and be run by one or more testers.

6.4 Test Design

The purpose of test design is to build a test case where it is describing the conditions of test for a specific testing item. To identify the test data of system and documented the description of test, both are consisting in testing design. The test cases of system and the expected result is discussing in testing description and the user acceptance is explains in test data. Thus, to create the test case for testing need both elements.

6.4.1 Test Description

The activity that are by identifying the test case of system and the expected result of module that have been documented are explain in test description. Also, the testing description is created to identify the features of system that embedded in the design and implementation and supply the details of test approach for testers. In testing term, test case is consisting of data input that have been documented and condition of operating that need to examine the test item with it result. A condition that to control the system functionality is called test case. Table A.2 in Appendix I shows the test case description.

6.4.2 Test Data

To execute the process of testing, thus need data as the value of input to run the test case. The administration of contractual need the software and data as a term. Financial and information of management is not including in this term. The test case must contain the test data. Table below will explain the test data use for test case.

System: Web Based Disease Prediction System
Module/Unit: Doctor
Done by:
Version: -
Revision: -
Date:

Table 6.13: Test Cases for Doctor

	Test Data	Description	Result	Action
PR_01_1001				
Test Data 1	**Username: Anne0105**	User insert valid username	Login successful and go to the home page	OK
Test Data 2	**Username: Ann**	User insert invalid username	Login failed, and alert message will pop out	OK
Test Data 3	**Username:**	User did not fill the form.	Login failed, and alert message will pop out	OK
PR_01_1002				
Test Data 1	**Disease Name: Fever Disease Description: Fever is the disease….**	User insert valid value for disease name and disease description	Data insert successfully	OK

Test Data 2	**Disease Name: 1234** **Disease Description:**	User insert invalid value for disease name and disease description	Failed to save the data	OK
Test Data 3	**Disease Name:** **Disease Description:**	User did not fill the form	Failed to save the data	OK
PR_01_003				
Test Data 1	**Symptom Name: Cool** **Symptom Description: Patient felt cold at hand and leg..** **Symptom Gender: Female** **Symptom Category: Adult** **Symptom Body Part: Leg** **Symptom Probability: Worst**	User insert valid value for symptom name and symptom description, dropdown menu for gender, category, body part and probability.	Data insert successfully	OK
Test Data 2	**Symptom Name: 1234** **Symptom Description:** **Symptom Gender: Select invalid drop-down menu** **Symptom Category: Select invalid drop-down menu** **Symptom Body Part: Select invalid drop-down menu** **Symptom Probability: Select invalid drop-down menu**	User insert invalid value for symptom name and symptom description, dropdown menu for gender, category, body part and probability.	Failed to save the data	OK
Test Data 3	**Symptom Name:** **Symptom Description:**	User did not fill the form	Failed to save the data	OK

	Symptom Gender: **Symptom Category:** **Symptom Body Part:** **Symptom Probability:**			
PR_01_007				
Test Data 1	**Treatment Name: Medicine** **Treatment Description:** **Get some medicine and rest..**	User insert valid value for treatment name and treatment description	Data insert successfully	OK
Test Data 2	**Treatment Name: 1234** **Treatment Description:**	User insert invalid value for treatment name and treatment description	Failed to save the data	OK
Test Data 3	**Treatment Name:** **Treatment Description:**	User did not fill the form	Failed to save the data	OK

System: Web Based Disease Prediction System

Module/Unit: Patient

Done by:

Version: -

Revision: -

Date:

Table 6.14: Test Cases for Patient

	Test Data	Description	Result	Action
PR_01_1005				
Test Data 1	**Month: May** **Body Part: Leg**	User select valid value from two dropdown menu	The system will display history of symptom	OK
Test Data 2	**Month: May** **Body Part:**	User only select value from one dropdown menu	Unsuccessful to view of history	OK
Test Data 3	**Month:** **Body Part:**	User did not select the dropdown menu	Unsuccessful to view of history	OK
PR_01_1006				
Test Data 1	**Symptom Checker:** **Pain (Check)** **Cough(Check)**	User select more than two symptoms to view possible diseases	The output of possible disease that will pop up is not accurate	FAIL
Test Data 2	**Symptom Checker:** **Pain (Check)** **Cough ()**	User select only one symptom	Alert pop up will show for user to select at least two symptoms	OK
Test Data 3	**Symptom Checker:** **Pain ()** **Cough ()**	User did not select any symptom	Alert pop up will show for user to	OK

			select at least two symptoms	

6.5 Test Results and Analysis

This segment demonstrates the test outcome and examination that cover on experiment recognizable proof and result whether or not it passes or fails. As per Appendix A, this project undertaking comprises of six experiments which all experiments at the primary time. The problem and answer of those test cases that has been failing, are shown within the table below.

Table 6.15: Test Result and Analysis

Test Case ID	Result	Description
PR_01_1001	OK	-
PR_01_1002	OK	-
PR_01_1003	OK	-
PR_01_1004	OK	-
PR_01_1005	OK	-
PR_01_1006	FAIL	The output of possible diseases is pop up, but the result is not accurate as the system unable to commit the changes of applying SQL statement which has been tested in MYSQL server
PR_01_1007	OK	-
PR_01_1008	OK	-

6.6 Conclusion

In conclusion, testing stage is critical after the system has been completely created on the grounds that it is expected to quantify the usefulness of the system when it is conveyed in reality. Also, can facilitate the overseer to discover if there any wrong in used the system. By giving this testing stage, the system can be resolved either achievement or not. The aftereffects of experiment are six experiments has been tried which is all has been passed. In the following section, the finish of this venture will be talked about particularly in Web Based Diseases Prediction System qualities and shortcomings, plans for future upgrades and commitments of system itself to individuals engaged with the task.

CHAPTER VII

CONCLUSION

7.1 Introduction

In chapter 7, which is the chapter to review the conclusion of developing this project. The conclusion be made is including testing and observation of the strengths and weaknesses on the system that has been built throughout this project. In addition, from the observation have been done, this chapter will discuss if there are any propositions for improvements in future and the contributions of system. Also, in this chapter will stated either the project is successfully meet the objectives or not and can develop all modules that have been mentioned in chapter 1.

Besides, the strengths and weaknesses of Web Based Disease Prediction System will be describe in this section because each system that has been developed has its own purpose, but there must be power and flaws of the system, as developer must learn from the flaws to develop the best system. The Strengths of project are that the developer successful achieve the project objective and something that special from others output that need to be proud. The weaknesses of project are something that stop achievement of project and must make improvement so that the output become more meaningful.

7.2 Observation on Weakness and Strengths

Based on the observation during the development phases, start from the first phase until the last phase, the Web Based Disease Prediction System has displayed the strengths and weaknesses. For the developers to fulfill user's requirements and improve the system features, the developer need to analyze the strengths and weaknesses of system.

7.2.1 System Strength

The observation on Web Based Diseases Prediction System has shown the following characteristics as its strengths.

i. The system has developed a symptom checker function for patients to find possible diseases at anytime and anywhere.
ii. The system has history search of symptoms and diseases function to help the patients for future references.
iii. The system has provided suggestion treatments for each disease for patient references.
iv. The system has pie chart of statistic patient's diseases for patients and doctor references.
v. The system interfaces are user friendly as it is designed to easy the user that will include from every layer of people and to make user feels good using the system.
vi. Database security is one of the strength for this system. Data from database only can be access by an authorized person. Administrator has full authorized in this system.

7.2.2 System Weakness

The observation on Web Based Diseases Prediction System has shown the following characteristics as its weaknesses.

i. The system has a lot of data and information to be stored in database.

ii. The system unable to commit the changes of applying SQL statement which has been tested in MySQL server. Such as for module symptom checker and module to show the list of symptoms to be match with each disease.

iii. The list of symptoms to be match with each disease by a doctor that display in the system are redundant, but the data stored in the database is not redundant. Just the list of symptoms is redundant.

iv. The system is limited to simple query only. The user can only insert, update or delete any data from the system. There is no store procedure or trigger that is used in the system.

v. The system did not provide feedback function for patients to comment about the possible disease after using symptom checker.

vi. The system does not have multiple language which is the system limited only in English version, so for others user to use the system might be difficulty.

vii. The system did not provide function to make an appointment with the available doctor for real diagnosis.

7.3 Propositions for Improvement

In developing a system, to define the more specialization on the system and to enhance the usability of the system need to do improvement of the current system because it is an important action and can create something different from others. Besides, user is difficult to be satisfied because user desire can change as it is not limited. Thus, it is still possible to improve the system since user's insights are changed from time to time, but developer will fulfill and try hard to satisfy the user requirements. From the side of security, it is very important for developer enhance the system security as the system hold big data and it is very significant to protect the confidentiality of the data. There are many features and security need to be enhanced in developing Web Based Disease Prediction System in future to improve the quality and performance of system. Also, to upgrade the efficiency of system and remove any bug in the system need to do improvement from time to time. Some of the recommendation of this project is by adding the function of patient can make an appointment with the doctor from the system. This can help save more time where patient can come to the clinic and go to see the doctor. Furthermore, this system should provide self-diagnosis questions for patient to know the state of health.

7.4 Project Contribution

In the nut shell, this system is made to help user which is patient to find the possible disease from the symptom that have been choose. Besides, the doctor who insert symptom, disease and treatment details can share the knowledge and experience into the system. This system has a great potential to be used as the system can save user time in searching about diseases details. However, Web Based Diseases Prediction System still needs a lot of improvements to serve better to user. Therefore, the improvements shall be done in future, and this application can give some inspiration to others in order to improve its features in the aspect of security, functionality, user interface and others. The development process of Web Based Diseases Prediction System is discussed from chapter 1 till chapter 6 and it provides a clear explanation on how the system is built. Thus, perhaps the undergraduate students may make use of this report, by reference it as their final year project.

Lastly, all the hard work and best effort have been applied, to develop Web Based Disease Prediction System, with the most advises get from supervisor, Mr. Muhammad Suhaizan bin Sulong, who has been helpful in terms of giving opinions and ideas from different angles during the PSM 2 project carry out

7.5 Conclusion

As a conclusion, Web Based Disease Prediction System is user friendly and has a high reliability as human who is doctor that is expect person, teach the system by implement all the experience and knowledges into the system for symptom checker module which is the main function of the system. This because, nowadays all information at fingertips and individual can get the information from internet by using handphone, laptop or computer. Thus, individual can access this system at anywhere and anytime for references. In additional, the main reasons individual need to use this system because to help a certain individual that feel reluctant to ask the doctor about any diseases especially rare disease such as HIV, scoliosis etc. Hence, the individual can search the disease from this system and get further diagnosis and treatment from real doctor. Also, this is a pure intention to help patients in any health problem and the system can help students, junior doctor or pharmacists in learning because the expect person who is doctor, can shared the knowledges and experiences into the system. Hence, the knowledges still can be learned by others or new generation. Unfortunately, the system needs a lot of improvement to kept organization's requirements at good shape and can be done in the future. Finally, the system has fulfilled the objective and solved the problems occurred of this project.

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APPENDICES 1

TESTING PLAN

Table A.1: Test Case of Unit Testing

Module/ Functional Component	Test Case ID	Test Case/ identification	Expected Output
Login Doctor and Patient	PRS_01_1001	Unit, Integration, User Acceptance	User insert valid username and password. The system does validation and if success, user will be displayed the home page of system. Unsuccessful if user insert invalid username and password.
Create Disease	PRS_01_1002	Unit, Integration, User Acceptance	All the form needs to be fill in by user. If user fill in the form not according to the format or not fill the required form, the system will pop up an alert message which is an error.
Create Symptom	PRS_01_1003	Unit, Integration, User Acceptance	All the form needs to be fill in by user. If user fill in the form not according to the format or not fill the required form, the system will pop up an alert message which is an error.
Match Symptoms and Disease	PRS_01_1004	Unit, Integration, User Acceptance	User need to fill in the required form and select the drop-down menu correctly. If user fill in the form not according to the format or not fill the required form, the system will pop up an alert message which is an error.
View Graph	PRS_01_1005	Unit, Integration, User Acceptance	User need to choose month to view the graph.
Symptom Checker	PRS_01_1006	Unit, Integration, User Acceptance	User need to select at least two symptoms. Unsuccessful to submit if user select less than two symptoms.
History Symptom	PRS_01_1007	Unit, Integration, User Acceptance	User need to filter the data by months and category. If user did not select, user cannot view the history symptoms.
Find Doctor	PRS_01_1008	Unit, Integration, User Acceptance	User need to insert valid doctor name or select specialist category or list of state to view the result.

			Unsuccessful if user insert invalid data.
Create Treatment	PRS_01_1009	Unit, Integration, User Acceptance	All the form needs to be fill in by user. If user fill in the form not according to the format or not fill the required form, the system will pop up an alert message which is an error.
Match Treatments and Disease	PRS_01_1010	Unit, Integration, User Acceptance	User need to fill in the form and choose treatments for each disease. If user fill in the form not according to the format or not fill the required form, the system will pop up an alert message which is an error.

Table A.2: Test Description

Module	Test Case ID	Test Case	Test Procedure	Expected Result
System Login	UTP_03_1 UTP_03_2 UTP_03_3 UTP_03_4 UTP_03_5	Unit Testing	Insert username and password then click button login	If the data entered by user match within data in database, the system will validate and show the home page according to user role. Else there is pop up message which is an error message will be displayed.
Add New Disease	UTP_03_1 UTP_03_2 UTP_03_3	Unit Testing	The system display doctor main page Select View Disease Click New Disease button Insert Disease details Click save button	If the data diseases entered by user match with data in database, the system will process insert operation and display successfully. Else there is pop up message which is an error message will be displayed.
Add New Symptom	UTP_03_1 UTP_03_2 UTP_03_3	Unit Testing	The system display doctor main page Select View Symptom Click New Symptom button	If the data symptoms entered by user match with data in database, the system will process insert operation and display successfully.

			Insert Symptom details Click save button	Else there is pop up message which is an error message will be displayed.
Add New Treatment	UTP_03_1 UTP_03_2 UTP_03_3	Unit Testing	The system display doctor main page Select View Treatments Click New Treatment button Insert Treatments details Click save button	If the data treatments entered by user match with data in database, the system will process insert operation and display successfully. Else there is pop up message which is an error message will be displayed.
Change Password	UTP_03_1 UTP_03_2 UTP_03_3 UTP_03_4 UTP_03_5	Unit Testing	The system displays user main page Select Change Password tab, then insert current password, new password and confirm password Click submit button	If user entered current password and new password according to the format correctly, the system will update the new data into database. Then the system will display "Password change. Please login again.". Else there is pop up message which is an error message will be displayed.

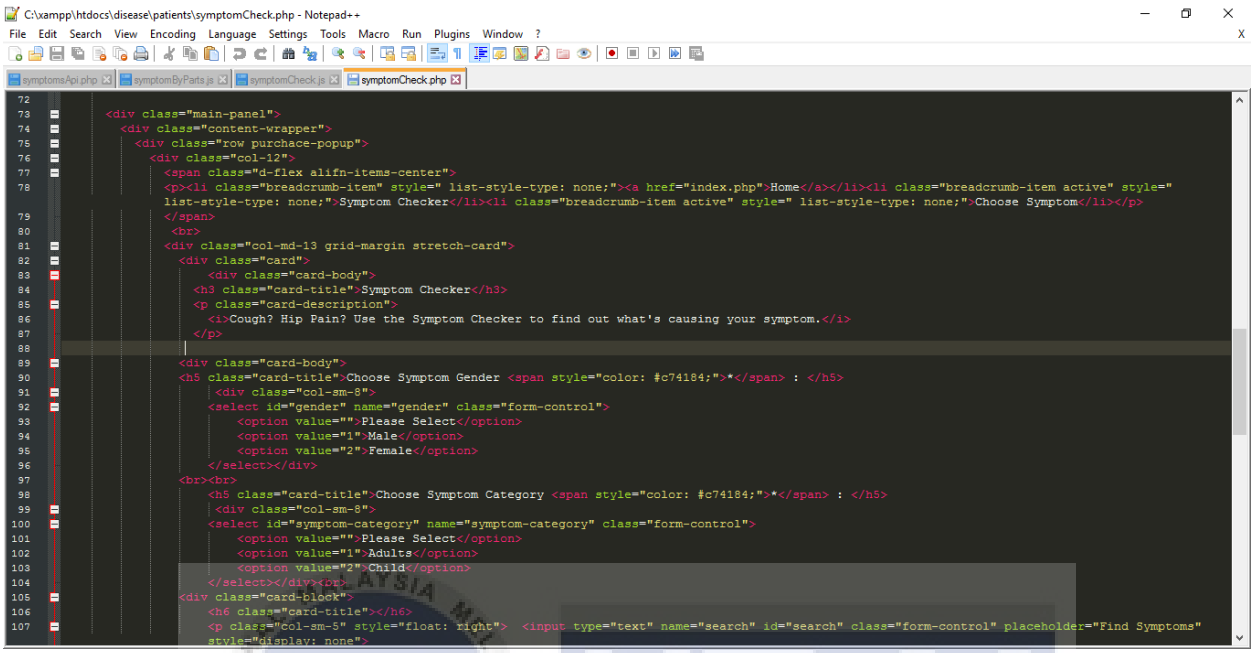

Figure: SymptomCheck.php source code

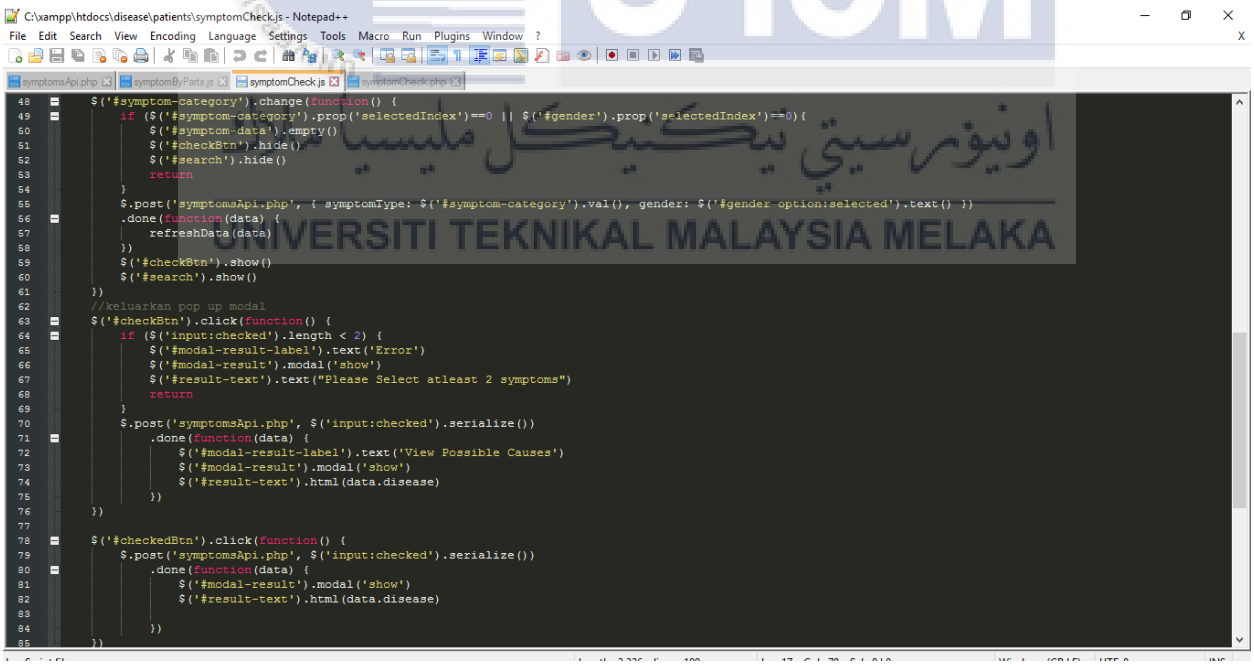

Figure: SymptomCheck.api source code

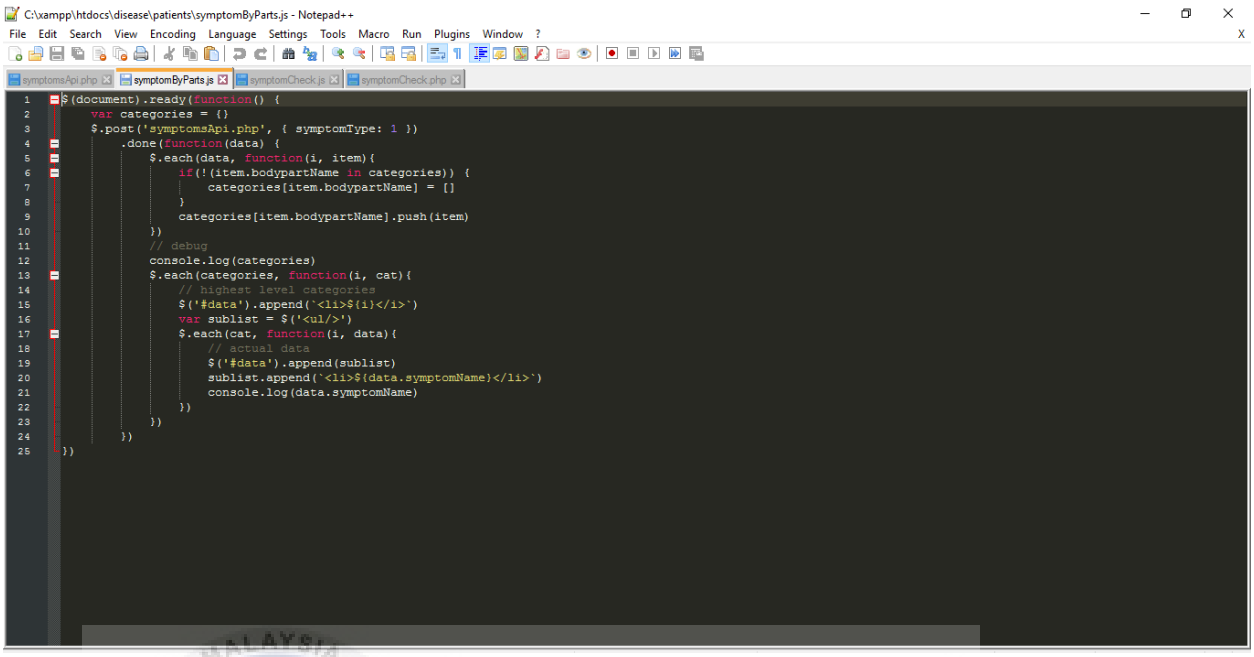

Figure: Bodypart.php source code

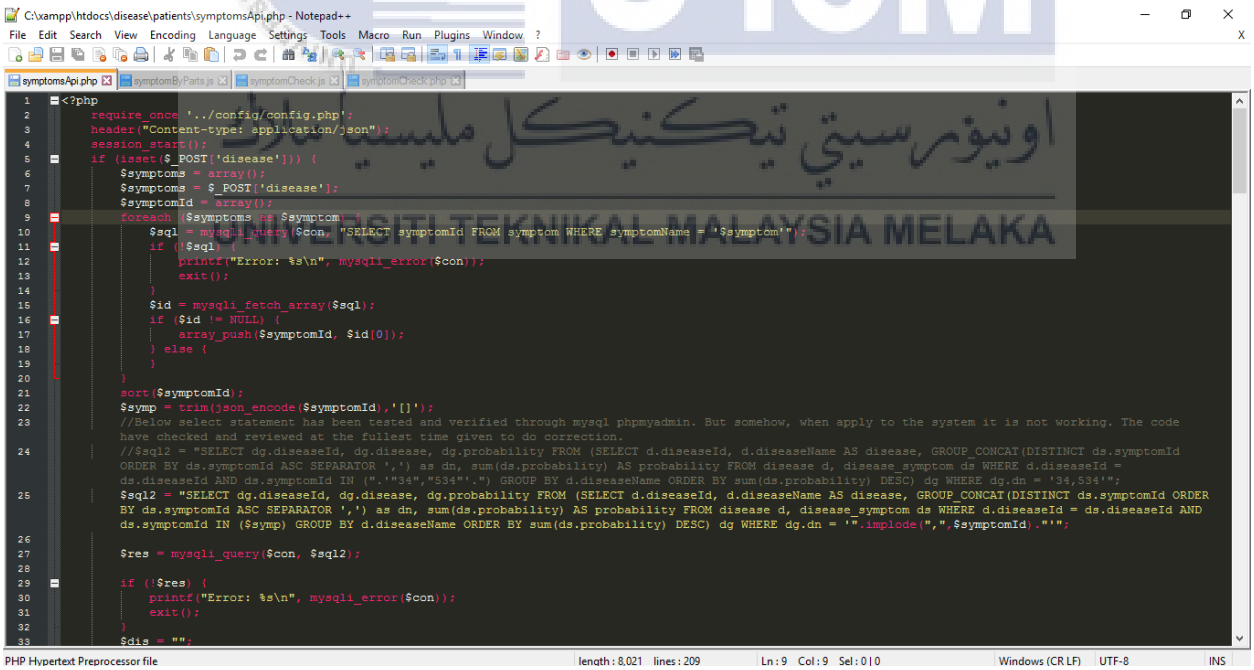

Figure: SymptomApi.php source code

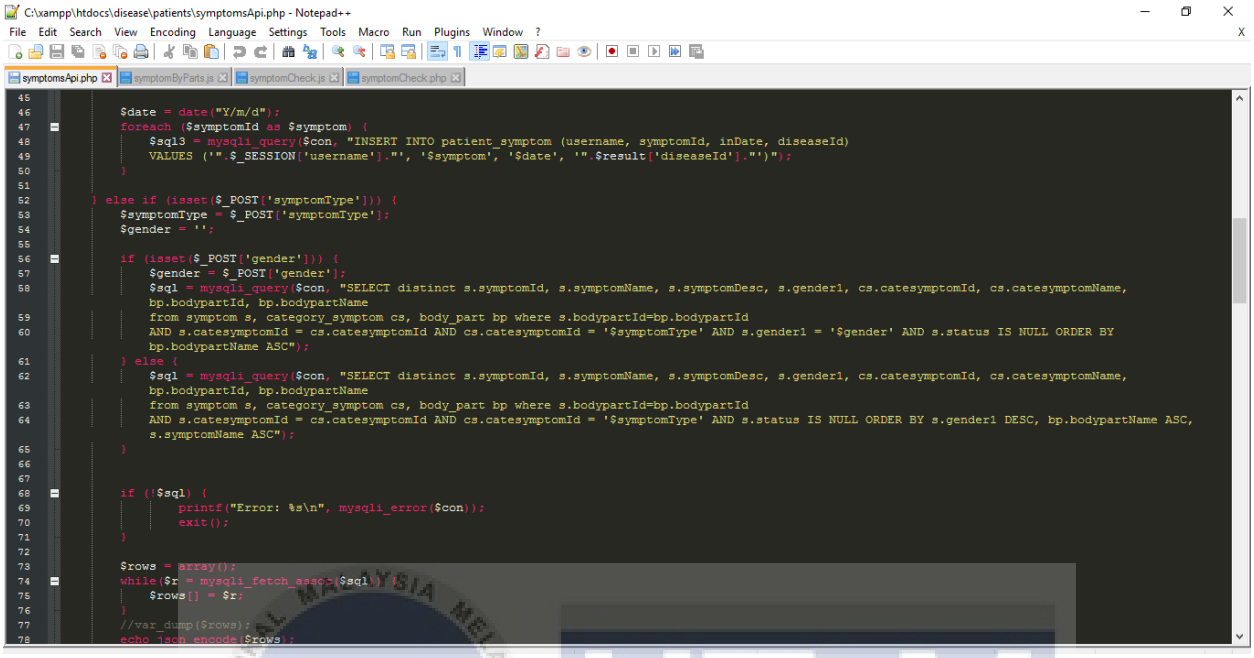

Figure: SymptomApi.php source code

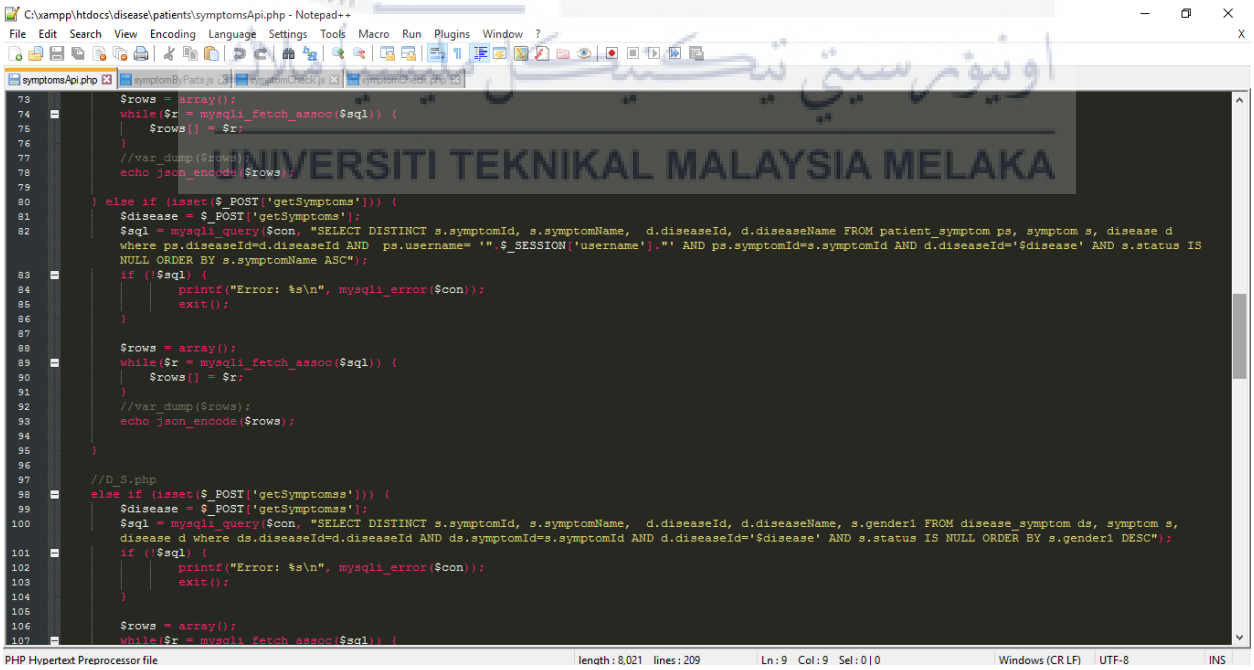

Figure: SymptomApi.php source code