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JUDUL: DIAGNOSIS INFECTION OF BONE SYSTEM

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Saya NOOR AZILAH PAKRI

(HURUF BESAR)

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(NOOR AZILAH PAKRI)

Alamat tetap :

1185 JALAN TELEKOM,
KG BERIS LAMPU,
22300 KUALA BESUT,
TERENGGANU



(PUAN SABRINA AHMAD)

Tarikh : 20 NOVEMBER 2005

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Diagnosis infection of bone system / Noor Azilah Pakri.

DIAGNOSIS INFECTION OF BONE SYSTEM

NOOR AZILAH PAKRI

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information and Communications Technology (BITS)

FACULTY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2005

DECLARATION

I hereby declare that this project report entitled
DIAGNOSIS INFECTION OF BONE SYSTEM

is written by me and is my own effort and that no part has been plagiarized
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STUDENT : _____ Date: _____
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DEDICATION

First and foremost I would like to dedicate my heartiest appreciation to my family, especially to my beloved father, Tn Hj Pakri Abidin who has giving me supports and has guiding me especially in completing the literature review for chapter two in this report. My special thanks also dedicates to my mother, Pn Hjh Asiah Abas who has also giving me love and support during completing this report.

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ABSTRACT

Bone disease is a disease that is causing a large number of deaths in the world. Survival rates may be increased when the disease is detected in its earlier stage. This disease can attack anybody in this world regardless of age, gender or status. To detect infections of bone diseases, many techniques would be used including X-ray, clinical presentation, pathogenesis and others. To assist doctors in analyzing the diseases, an expert system has been developed. Expert systems are computerized advisory programs that attempt to imitate the reasoning processes and knowledge of experts in solving specific types of problems. They are used more than any other applied AI technology. Expert systems are of great interest to organization because of their potential to enhance productivity and to augment work forces in many specialty areas where human experts are becoming increasing which is hard to find and retain. There are three types of infections that can be detected by this expert system. It acts as a helping tool for specialist and trainees to do their job effectively. This expert system also allows getting preliminary diagnosis for the disease and indirectly, they are exposed to the medical field. This expert system is a tool that can assist a doctor to organize knowledge and make decision, not to replaced doctor.

ABSTRAK

Jangkitan tulang merupakan salah satu penyakit yang boleh membawa maut. Kajian menunjukkan kadar kematian boleh dikurangkan jika jangkitan tulang ini dapat dikesan pada peringkat awal. Penyakit ini boleh menyerang manusia tidak kira peringkat umur, jantina ataupun status. Bagi mengesan jangkitan tulang ini, terdapat pelbagai teknologi perubatan telah digunakan termasuklah x-ray, ujian klinikal, pathogenesis dan sebagainya. Bagi memudahkan doktor untuk mengesan dan menganalisis penyakit ini pada peringkat awal, satu aplikasi expert sistem telah dibangunkan. Expert sistem merupakan satu aplikasi berkomputer yang ditelah dilengkapi dengan program yang mampu berfungsi sebagai perunding atau penasihat yang akan membantu doktor dalam membuat keputusan dan membuat penyelesaian masalah. Sistem ini menggunakan teknologi AI, 'Artificial Intelligent' dimana ia merupakan satu teknologi yang mampu meningkatkan produktiviti sesuatu organisasi mengikut kefungsan aplikasi yang dibangunkan tersebut. Di samping itu, aplikasi ini juga mampu membantu doktor khususnya doktor pelatih dalam mendalami bidang ini dengan lebih mendalam dengan segala maklumat yang boleh dicapai melalui sistem ini.

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LIST OF SYMBOLS

TERM	DESCRIPTION
DIB	Diagnosis Infection of Bone System
OOAD	Object-oriented Analysis and Design
OMT	Object Modeling Technique
OOADA	Object-oriented Analysis and Design with Application
UML	Unified Modeling Language
ERD	Entity Relationship Diagram
PHR	Patient Health Record
PMI	Patient Master Index
UI	User Interface

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CHAPTER 1

INTRODUCTION

1.1 Overview

Bone disease is a disease that is causing a large number of deaths in the world. Survival rates may be increased when the disease is detected in its earlier stage. This disease can attack anybody in this world regardless of age, gender or status. To detect infections of bone diseases, many technique would be used include X-ray, clinical presentation and pathogenesis. To assist doctors in analyzing the diseases, an expert system has been developed. Expert systems are computerized advisory programs that attempt to imitate the reasoning processes and knowledge of experts in solving specific types of problems. They are used more than any other applied Artificial Intelligent, AI technology.

Expert systems are of great interest to organization because of their potential to enhance productivity and to augment work forces in many specialty areas where human experts are becoming increasing by difficult to find and retain. There are three types of infection that can be detected by this expert system. It acts as a helping tool for specialist and trainees to do their job effectively. This expert system also allows getting preliminary diagnosis for the disease and indirectly, they are exposed to the medical

field. This expert system is a device to assist a doctor to organize knowledge and make decision.

This chapter will discuss on the preview of the system to be develop, project background, problem statement, objectives, scope of the project, project significance and expected output.

1.2 Project Background

There are many research has been done to develop a system that having most compatible function in order to fulfill user needs in an organization. Therefore, an expert system is developed with artificial intelligent concept and technology to assist human in managing their work to be more efficient. Nowadays, most of big company and selected organization using this expert system to assist them in managing their work, such as hospital and specialist clinic, and Construction Company.

The project to be developed is Diagnosis Infection of Bone and it is categorized in electronic medicine sector. The features applied in this project are value-added and commercial value. This system does not have a specific user, it is depends on which organization involves and use this system. This system is appropriate to apply in medical sector such as hospital and specialist clinic.

Currently, there is not much expert system is applied in medical sector in order to help the doctor to diagnose the bone infection, especially in consultation area. Normally, the doctor will check the patient condition and get the detail information of the patient's illness and gives the medicine to cure the disease. However, without a specific medical test, it is hard to detect bones infection in earlier stage. This situation will make the disease becomes more serious and may cause to death if it is only found when the infection is already in critical.

Normally, this infection can only be detected by using modern medical technology such as x-ray, clinical presentation, pathogenesis and etc. To solve this problem, a system is develop in order to analyze the symptom so that the doctor will know the specific infection and disease that experienced by the patient.

Apart from that, the system will also be able to detect causes and complication of the infection in details so that the doctor may advise the patient to prevent the disease. Besides that, the system will also be able to list out suggested treatment that should have been taken. Besides, it is also able to retrieve all the information related to the illness and may help the doctor in making decision and to find out the solution to cure the disease.

Furthermore, this system may also have ability in maintenance purpose so that it is easy for the doctor to update the information and upgrades the system so that the information provided is up to date and includes the latest information in order to achieve the most effective results.

Moreover, this system will also have security function in order to limit the accessible so that it can only be accessed by authorized person. This security function is important to keep the patient personal data and information in secure from achieved by unauthorized person.

This system will also provide patient health record to assist the doctor in doing their work faster and easier, and at the same time keeping the data in consistent. Besides, it will be able to generate reports for the patient that have visited to the medical center and recorded what the treatments have been given to the patient.

1.3 Problem Statement

The recent feature in existing system is having a diagnosis intelligent function which makes it easy to scan the database using various techniques. This system provides explanations of about thousands possibility and conditions of the early warning signs, the symptoms, and complications. However, this system still encounters several problems.

The current existing system did not have the patient health record. Besides, this system is also did not have patient treatment analysis report in order to create the patient treatment information to ease the doctor in giving further treatment. The example system referred is Trauma which deals with the main discipline encountered in the accident and emergency clinic- medicine obstetrics and gynaecology, orthopaedics, paediatrics, and surgery and surgery. Besides, this project is develops due to these following problem statements:

- i. No patient health record to retrieved patient medical history

This system did not have patient health record to keep all the patient information such as personal information, medical history, family background medical history and disease suffered by the patient. Therefore, the doctor did not get the details information about the patient background and medical history to help them in making decision for the disease suffered by the patient.

In order to produce the most functional system, the patient health record module will be added. The patient health record will keep all the patient information includes patient personal details and patient medical history. So, the doctor will be able to retrieve patient information so that they will understand the patient position even if the doctor is never handling the patient's case.

ii. No specific treatment analysis report for doctor and patient future reference

Normally, the patient personal details such as name, age, and gender will be input into this system before the patient is diagnosed. But, the diagnosis result is not kept or saved in the database. This information will disappear once the doctor quit the action and switch to other function. This information is important as a reference to the doctor especially in consultation area and to make decision for the patient's further treatment that should have been taken. Therefore, the doctor has to redo the diagnosis to confirm the patient condition before further treatment is given. This situation will be a waste of time and useless.

The treatment analysis report will generate all the patient information about the treatment received and diagnosis results. The report will come out in details explanation about the patient personal detail, the infection found, the treatment received and the further action should have been taken includes the time for the next visit for further treatment.

iii. No security function to limit the accessible of the system

Moreover, the existing system also did not have a security features that can limit the accessible for the user. This security function is important in order to keep the data in secure so that it can not be retrieved by unauthorized user.

This system will be provided with security function includes user name and password, and access right is limited to only the selected person.

iv. The doctor is not having enough experience

Sometimes, the doctor could not find the specific disease experienced by the patient, such as chronic disease, which is seldom found from the patient especially for the post-training doctor. So this system will help the doctor to find

out what the diseases were and the causes, and find the suggested medicine for treatment. Besides, this system will also assist the doctor to manage a patient in short time.

v. Time consuming

In current manual flow system, the doctor still records the details of treatment and medicine information manually by hand writing on a piece of paper. This action will waste more time and the transcript may be able to loss or damage since the paper is easy to destroy. The more time taken by the doctor to complete a diagnosis, the more time spent by other patient for queue. Furthermore, it may cause difficulty to the other department such as pharmacies to read the doctor handwriting. This may cause delay and the patient will have to wait for a long time to get the medicine. This situation may decrease the service performance of an organization. The use of this system will help to reduce time taken to complete a diagnosis, and at the same time it can save other patient's time because they will not have to queue longer to take turn.

vi. Data is not consistence and not confidential

Normally, patient's information is recorded in a paper-based source and will be kept using a filing system, which the nurse or the assistant needs to find the patient record one by one. The data is hard to keep track and it takes time to be reached, since there are thousands of data is stored at one place. Besides, the security of data is also not very secure, since it can be achieved by any staff, which can be a nurse or a doctor or an assistant that having an authority to enter the room, where the data is stored and hence, it can also increase the possibility of data lost and damage.

The data maybe changed or edited, or exchanged with other patient because of carelessness. This may caused data is not confidential. There are

many case happened in medical center, which the nurse exchanged the patient blood test with other patient without realized it. This will cause many problems because the data is not true. So the system to be develop will make sure the data is consistence and very confidential to avoid this kind of situation.

vii. **Data entry redundancy**

In current business process, there is a situation which the same information may be recorded by different department in the hospital. This is happened mostly on the patient registration. This patient may have been registered on a department, but he is registered once again at other department such as pharmacy department, laboratory department and radiology department. So, there will be more than one record for a patient recorded in the hospital and this situation will make difficulties for the administrator to manage the patient records.

1.4 Objectives

This system is developed based on these following objectives:

- i. To provide a useful expert system that having the ability to access information that support strategic decision-making.

This expert system has been developed to assist doctors in analyzing the diseases so that it can decrease the number of death impact by this disease. This system will help the doctor to diagnose bones infection includes finding out the cause and complication and giving suggestion of essential treatments by analyzing the symptoms so that the disease can be detect earlier in order to cure the disease from it getting worse. This system is important to assist the doctor

and trainees in decision making and to organize knowledge, not to replace a doctor.

- ii. To support administrative operation by providing a function to administer patient health record and automate the treatment analysis reports.

This system will also provides the health record to store patient information in secure to avoid from data loss and data redundancy. This system will keeps all patient information in the database. All patient information includes personal details and their past medical history will be recorded for future reference by the doctor. Besides, this system will also come out with the patient treatment analysis. This system will be able generate the patient treatment report automatically once all the information of the patient treatment is completed.

- iii. To provide a secure patient health record by using different level of authorization security system.

This systematic database system will provides more security function and it is difficult to hack or retrieve without an access right. This system may be used by the doctor and nurse. The doctor can access all the system function includes the maintenance functions. Meanwhile the nurse can only access the patient health record and view the treatment analysis report, but cannot edit or update it. So, to differentiate the access right between the doctor and nurse, they must have their own user name and password and also will be given specific access right and user role so that user accessible is limited. This function is important so that the nurse cannot access confidential information accept the doctor and to make sure the data is cannot be retrieved by unauthorized person.