RFID BASED MEDICAL DATABASE SYSTEM

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To my beloved mother and father

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ABSTRACT

This "RFID based Medical Database System" project is developed by using Radio Frequency Identification (RFID) system and ID patient card. The purpose is to improve and replace the traditional way of healthcare services which still using paper-data-recording system. This project also to facilitate the centralisation of patient records within the hospital environment. This old style services cause time consuming which result inefficiently and unsystematically in keeping the patient information. Moreover spaces is needed for storing the patient information data and it has potentially to lose due to accident or stolen. In order to improve the services, this project is developed with the RFID system and web-based database of patient information. Five chapters have been discussed and explained in this project so that all the achievement in this project is made. The project system functioning with data stored in the ID of patient card and the information web-based database will be administrating by Microsoft Access. Graphical User Interface (GUI) was developed using Visual Basic to make the database easier to access. The merging of RFID technologies and the advances in web-based database systems provides standardised and centralised hospital records, with a strong emphasis on data security. Overall this system requires RFID tag which is the patient ID card, RFID reader and computer in order to control the system work correctly.

ABSTRAK

Projek "Sistem berasaskan RFID untuk Sistem Perubatan dengan menggunakan pangkalan data" ini dibangunkan menggunakan sistem Pengesanan Radio Frekuensi (RFID) dan kad ID pesakit. Tujuannya adalah untuk meningkatkan dan menggantikan kaedah tradisional perkhidmatan penjagaan kesihatan yang mana masih menggunakan sistem merekod data menggunakan kertas. Projek ini juga bertujuan memudahkan pihak perubatan merekod data-data para pesakit yang datang. Perkhidmatan cara lama ini menyebabkan banyak masa digunakan yang mana informasi pesakit yang disimpan tidak efisien dan sistematik. Tambahan pula, ruang diperlukan bagi menyimpan data pesakit dan ia berpotensi untuk hilang seperti disebabkan kemalangan atau kecurian. Bagi menambahbaik perkhidmatan ini, projek ini dibangunkan dengan sistem RFID beserta pangkalan data maklumat pesakit. Lima bab dibincangkan dan dijelaskan dalam projek ini supaya kesemua matlamat dapat dicapai. Sistem ini berfungsi melalui data yang disimpan di dalam kad ID pesakit dan pengurusan pangkalan data dijalankan oleh Mircosoft Access. Antaramuka grafik pengguna (GUI) dibangunkan menggunakan Visual Basic bertujuan memudahkan akses ke pangkalan data menjadi lebih mudah. Gabungan antara teknologi RFID serta berasaskan laman internet ini menyediakan rekod para pesakit diseragamkan dengan keselamtan merekod yg lebih jamin. Keseluruhannya, sistem ini memerlukan tag RFID iaitu kad ID pesakit, pembaca RFID, dan komputer dalam mengawal sistem ini berfungsi dengan betul.

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LIST OF ABBREVIATIONS

DBMS	-	Data Management System
COM	-	Component Object Model
GUI	-	Graphical User Interface
ID	-	Identification
IDE	-	Intergrated Development Environment
ISO	-	International Organization of Standardization
LF	-	Low Frequency
MS	-	Microsoft
PIN	-	Personal Identification Number
RF	-	Radio Frequency
RFID	-	Radio Frequency Identification
SQL	-	Standardized Query Language
TCP/IP	-	Transmission Control Protocol/ Internet Protocol
UHV	-	Ultra High Frequency
VB	-	Visual Basic
VBA	-	Visual Basic for Application

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CHAPTER 1

INTRODUCTION

1.1 Background

Radio Frequency Identification (RFID) is a new technology that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal, or person. RFID tags are not an "improved bar code" as the proponents of the technology. An RFID system consists of three components which is the tag (transponder), the reader (interrogator) and the host computer (controller).

The reader communicates with tags in its wireless range and collects information about the object to which tags are attached. The antenna uses radio frequency waves to transmit a signal that activates the transponder. When activated, the tag transmits data back to the antenna. RFID technology differs from bar codes. RFID can read the tag using RF, meaning that the RFID reader can be read from a distance, right through our clothes, wallet, backpack or purse.

Besides, the RFID tag consists of unique ID for each tag. The technology used in RFID has been around since the early 1920s. In our country, this technology already

been used for several years in certain place such as in Highway using card 'Touch N Go' and our government also apply this technology by using RFID as I.C. (identification card). Some places, they prefer to used Barcode which is cheaper than RFID. Technology spread very fast. In few years later, there is not impossible if RFID will replace the barcode system in today's life.

"RFID based Medical Database System" is a project about medical system which makes healthcare service or procedures easier for both patient and doctor. The project implementation is based on RFID system and programmed ID card. An ID card is given to patient as he or she once registered at any clinic to have treatment, medical examination or to having any medication. Nowadays, doctors or clinic staff needs to use paper to record patient registration, information and giving medication. This traditional system is time consuming not only for themselves but also to the patient waiting for check up or other matter.

Therefore, this project could assist medical staff to reduce the problem as well simplify all the procedures. Patient also gets their benefit by only bring the ID patient card and hand over it to the person in charge at the clinic. By scanning the card on the reader, all information and medical history of the patient's card displayed through personal computer or laptop which store in the web-based database system. The application of RFID system result save more time and modern the medical traditional system.

For this project, green technology has been applied because the usages of paper are less. There are no needs to use paper in order to record or register patient as they taking treatment to any medical department. Therefore there are no needs to cut trees in order to make more paper. This is the main good reason for implement this project to market.

Moreover, all documentation can be stored properly and effectively through the database. And of course all the information of all patient are private and store

confidentiality to other staff and only certain parties are able to access the full patient information. In addition, the patient information cannot be changes or edit at will. It is because all database stores will be uploaded through the server and creates robust security.

Last be not least, this project helps doctor and other medical department to look after and supervise patient with all treatment they have been made with all their allergies or chronic disease. So that doctor would carefully and aware of the patient disease to any medicine that would affect patient condition get more badly. All the information stored has been compiled and organized effective and easy to read by the doctor.

The implementation of this project consists of RFID system and database programming. Radio frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag for the purpose of identifying an object. RFID system has three components in the system which is transponder or tag, reader and computer software.

1.2 Objectives

There are three main objectives in pursuing the accomplishment of this project.

i. To study on data transfer between RFID system and Visual Basic

RFID reader will read the data and communicate with the interface on Visual Basic for display and then to compare with database.

ii. To develop graphical user interface (GUI) using Visual Basic that will integrate with RFID system

The idea is to build a medical system for improving the healthcare service and make it easier and efficiently. Therefore interface needs to build that integrate with the RFID system and will show the card code. Moreover another interface also need to capture and record patient information.

iii. To create and design database of patient information

Database of all patient information need to be created and designed in arranged and sequentially so that user can find or search patient information in such a simple view.

1.3 Project Scope

The main core of this project is the RFID system synchronizes with the interface on Visual Basic and also through the database of patient information.

i. Use appropriate RFID tag and reader for this project application

There are several of RFID reader and tag sold in the market whether through internet or direct seller. Not only brand, but also frequencies of the RFID itself need to be considered in choosing correctly so that both part together functioning. Since this system will be applied to a healthcare service, the RFID reader must used same frequencies as the given patient ID card. For most of the uses, the type of tag or patient ID card is Cytron Technologies RFID-IDR-232N type and its frequency is 125 KHz.

ii. Design and implement a system in healthcare service using RFID

The tag or the patient ID card will scan to the RFID reader. The RFID reader will use to detect the patient ID card code. The code will use to compare with

database and the information in database will be display and store by using interface on Visual Basic.

iii. Database contain only general information

Only general or important information of the patient are included in the database. The general information stored in the database is only by referring from identity card (IC), as well as add on information of the patient's physical and medical information such as height, weight, blood pressure and others. The database linked to other clinic so that patient information can be access at any clinic which patient desired for having treatment.

1.4 Problem Statement

"RFID based Medical Database System" project is proposed to improve the old method of the healthcare service which uses sheet in registration, recording and updating patient data. For this project implementation, it will make healthcare service or procedure easier and efficiently for both doctor and patient.

For current healthcare services system, they still using paper which causing time consuming. This traditional method of updating or finding the data stored in manual system requires lot of times. It is because paper sheet contains of patient information requires place for storing them. Besides that, this old method is inefficient and unsystematic which will lead several consequences to patient itself. And of course paper sheet has potentially lost such as stolen, misplace or could burn in fire incident.

Therefore, this system is applied with an RFID system and database for replacing the paper sheet used. With this system, not only will it benefit the patient, but also the doctor and medical staff as they can focus to the patient treatment. Moreover, green technology has been applied for the society and country benefits. It is because no

paper is needed in this system. Rather than that, doctor would can avoid any mistakes in giving medication to patient because database showed all patient medical history and doctor could maintain his professional to serve to the society.

1.5 Outline of Thesis

This thesis has 5 chapters. **CHAPTER 1** explains the background of objective and scope of the overall "RFID based Medical Database System" project. It describes the problem statement why healthcare service and RFID system is developed.

CHAPTER 2 is on the theory about RFID system components, Visual Basic and Microsoft Access software. Literature review is regarding the preview of project on the healthcare service RFID system.

CHAPTER 3 focuses on the methodology of the project. Most development is about building the interface between RFID system and database. The methodology is divided into two parts which are the hardware development and the software design. Software design is divided into three modules which consist of the RFID, the database and the view module.

CHAPTER 4 is where all the expected results of project are presented. Here, the GUI shows it is successfully integrated with the hardware and the database. Lastly, for **CHAPTER 5** explains the discussion and conclusion. Some recommendations for future development are discussed.

CHAPTER 2

LITERATURE REVIEW

2.1 RFID System

Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies [1]. The "RFID based Medical Database System" project involve in medical environment especially focus in fulfill patient needs and facilitate them. With RFID technology and programming information, a system that manages to facilitate everyone is made by programmed a tag for patient so that all patient details and document could stored through the tag.

RFID system consists of 3 basic components which is tag, reader and the computer and software for instruction and overall building the medical system. The medium in implicating the RFID like radio waves also will be covered in this chapter. For the tag, a programmed data will be applied so that it can work in every time tag placed to the reader. Or in other word the reader could read the tag and transfer the data to be displayed.

In displaying the tag information, a programmed database also need to be create. Interface in the database programming is important because it is format the details which need to display through the database window. It is displaying the arrangement of the patient details and all patient document matter through the database. Therefore all the recording paper is need no more because this project system is facilitate to everyone and also avoiding any data missing or misplace. This chapter will cover on the concept of the project. This project will focus on RFID method for implying it on medical healthcare system.

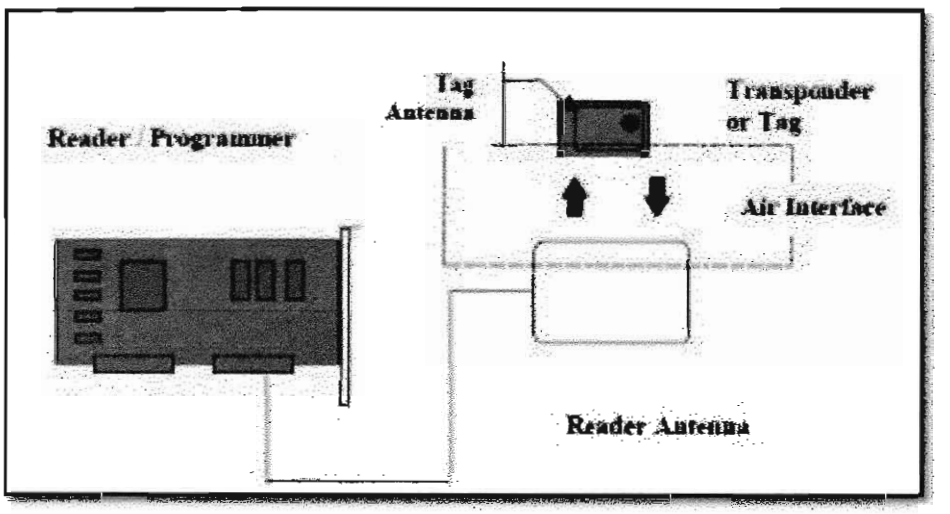

Figure 2.1: RFID System [2]

Compared to other technologies, the RFID has great advantages regarding several factors respectively as shown in figure below which makes it the suitable choice for this project.