RFID APPLICATION SYSTEM IN CHECKING PATIENT

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A thesis submitted in partial fulfillment of the requirements for the award of thedegree of Bachelor of Computer Science (Computer Systems & Networking)

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MAY 2011

PERPUSTAKAAN UNIVERSITI MALAYSIA PAHANG	
No. Perolehan 068696 Tarikh 30 NOV 2012	No. Panggilan TV 6553 * NG7 2011 +s Bc •

ABSTRACT

In this research, I will focus on the software design and database system model for RFID Application System in Checking Patient. This system builds to replace the manual process to register patient information and avoid medical mistake. The previous manual process had caused a lot of troubles and not systematic. IT is developed to provide a digitalizing form to help the administrator to perform their task in a more efficient way and also to avoid mistake in checking patients especially in ward. Based on the system, it provides data availability for read operations while supporting faulttolerance and fast data transformation. Accurate, relevant and timely information required the use of sophisticated system, with the database management system, with usingMicrosoft Access.

ABSTRAK

Dalam kajian ini, saya akan fokus pada pembinaan sistem dan model sistem maklumat untuk Sistem Aplikasi RFID Memeriksa Pesakit. Ini dibina untuk menggantikan proses manual untuk mendaftarkan maklumat pesakit dan mengelakkan kesalahan perubatan. Proses manual sebelumnya telah menyebabkan banyak masalah dan tidak sistematik. System IT dibangunkan untuk memberikan bentuk digital untuk membantu pentadbir untuk melakukan tugas-tugas mereka dengan cara yang lebih cekap dan juga untuk mengelakkan kesalahan dalam menyemak pesakit terutama di wad. Berdasarkan sistem ini, ia menyediakan ketersediaan data untuk operasi baca smbil menyokong kesalahan-toleransi dan cepat transformasi data. Maklumat yang tepat, relevan dan tepat pada masa diperlukan penggunaan sistem yang canggih, dengan sistem pengurusan maklumat, dengan menggunakan Microsoft Access.

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CHAPTER1

INTRODUCTION

1.1 Introduction

The RFID system is one of the standard systems used for automatic identification or recognition (auto identification; Auto ID). By using radio waves to transmit recognized data and complete identify and content recognition, this system can carry out, exchange data, object tracing, classification, and statistical analysis and more quickly and without spatial limitations.

Radio frequency identification (RFID) technology uses radio waves to automatically identify physical objects which is either living being or inanimate items. Therefore, the range of objects identifiable using RFID includes virtually everything on this planet. For this RFID technology is likely automatic identification (Auto-ID) technology by which a physical object can be identified automatically. Other examples of Auto-ID are bar code, biometric, voice identification and optical character recognition (OCR) systems.

1.1.1 **RFID's characteristics**

Figure 1 above show an RFID system, this system is an integrated collection of components that implement an RFID solution. An RFID system consists of the following components from an end-to-end perspective; which are tag, reader, reader antenna, controller, (sensor, actuator and annunciator), (host and software system) and communication infrastructure.



Figure 1.1 RFID System

An RFID tag can be classified in two different ways. First ways is based on whether the tag contains an on-board power supply and/or provides support for specialized tasks; passive, active, semi-active. And the other way is reader that also called an interrogator, is a device that can read from and write data to compatible RFID tags.

RFID is a method for remotely storing and retrieving data using devices called RFID tags or transponders. An RFID tag is a small object, such as an adhesive sticker, that can be attached to or incorporated into a product. RFID tags are composed of an antenna connected to an electronic chip. These chips transform the energy of radiofrequency queries from an RFID reader or transceiver to respond by sending back information they enclose. Finally, a computer hosting a specific RFID application or middleware pilots the reader and processes the data it sends. RFID has great characteristics, which are it is possible to scan tags in motion and since it use radio waves, so it can pass through most solid objects, the tags don't need to be in direct line of sight of the RFID reader.

Having labeled or tagged objects being identifiable in a ubiquitous and flexible manner is already a good start. With using unique number one can easily retrieve data about them. Especially in healthcare, it van improves patients safety by reducing medication errors.

1.1.2 RFID in Healthcare

Technologies of identification by radio frequencies (RFID) experience a fast development and healthcare to be one of its major growth areas. The application of Radio Frequency Identification (RFID) to patient care in hospitals and healthcare facilities has only just begun to be accepted. It's because with using this application, it will give many benefits to patient care and hospital operations. It examines how patients are processed from admission to discharge, and consider where RFID can be applied. From a time-and-motion perspective, it shows how hospitals can apply RFID in 3 ways; which is fixed RFID readers interrogate mobile objects; mobile, handheld reader interrogates fixed objects; and mobile, handheld readers interrogate mobile objects.

Implemented properly, RFID can significantly aid the medical staff in performing their duties. It can greatly reduce the need for manual entry records, increase security for both patient and hospital, and reduce errors in administering medication. Hospital is likely to encounter challenges, however, when integrating the technology into their day-to-day operations. What we can help hospital administrators determine where RFID can be deployed to add the most value.

The application of Radio Frequency Identification (RFID) to patient care in hospitals and healthcare facilities is just beginning to be accepted. The technology offers great potential benefits and is the next big step in identifying and tracking patients, objects and assets; and also speeds up or eliminates many manual operations in checking and processing patients. To reduce such errors, some hospitals have started utilizing wristbands embedded with RFID chips for identifying patients electronically and matching those patients to necessary surgical procedures.

1.2 Problem Statements

The registration of patients in the hospitality is increasing tremendously throughout the year. At the same time, the information of medicine and patients are also increasing which make the administrators of the pharmacy find it difficult to search for the information they want. As the current system used by most medical place are the manual recorded mean into log book, searching and any update of information; and some places like main hospital has using a digital system without RFID application to manage patient data. However, the medical staffs also have difficulties in checking patients' information because there is a lot data to be identified in file or system. Therefore, they may face problems in checking patients and can cause mistaken data and problem in time management.

Many health professionals are concerned about the growing number of patients who are misidentified before, during or after medical treatment. Indeed, patient identification error may lead to improve dosage of medication to patient, as well as having invasive procedure done. Other related patient identification errors could lead to inaccurate lab work and results reported for the wrong person, having effects such as misdiagnosis and serious medication errors.

1.3 **Objectives**

The objectives of this project are:

- 1. To implement a RFID application system to improve the checking patient system from manual application to digital application.
- 2. To deduct the maintenance of a long periodtime in management; thus make easier workflow to medical staffs.
- 3. Help avoiding several mistakes/error, such as patients' misidentification.

The scopes of this project are:

Scope System

- 1. Prototype focus in RFID application.
- 2. To prevent data misidentification.

Scope User

- 1. The prototype is use for medical staff:
 - Doctor and Nurse: checking patient and update medication data.
 - Other Medical Staff: register patient information & update patient information.
- 2. The prototype is use to patients that stay in ward only.
 - Using wristband tag as patient identification.

1.5 Thesis Organization

The thesis is organized in five chapters. Chapter 1 presents a general background of the research focus, problem statement, and research objectives and scopes.

Chapter 2 covers the literature review. First, an introduction to highlight the point discussed in this chapter. An overview of RFID's characteristics, practical application in medical, advantages and disadvantages of using RFID and benefit of RFID's system is presented. Besides that, this chapter will analyze and overview in particular the existing systems in Leveraging RFID in Hospitals, Handheld RFID Patient Safety Improvement and Building & Smart Hospital using RFID technology in what techniques that they used. And also make comparison between those 3 RFID existing systems.

In chapter 3, the research methodology is presented. The development phases are presented. The phases are including analysis about the system; designing of system needed, flow process of the system, list the entire requirement needed and also testing the system. This chapter is intended to provide sufficient details on the method used, procedures followed, and overall development process.

In chapter 4, all the results and discussions are presented based on the experimental results. Finally, conclusion and contribution of the thesis are presented in chapter 5, along with the suggestion for future works based on the analysis and evaluation proposed method.

CHAPTER2

LITERATURE REVIEW

2.1 Introduction

This section for discuss about RFID's characteristics, practical application in medical, advantages and disadvantages of using RFID. Besides that, this chapter will analyze and overview of benefit of RFID's system, existing systems and techniques that they used. And also make comparison between RFID existing systems which is consisting of what of category manufacture that they make system, their application, tools, functions, security, issues and solutions.

2.1.1 RFID's practical application in medical.

Apart from its basic fast recognition feature, the RFID technology has other features, such as:

Application	Description
1. Radio reader	It directly reads information and inputs this into
	databases through RFID Readers.
2. Large reading quantity	It allows the processing of many tags at one time and
	records the treated conditions on the tags for future
	reading.
3. Mobile reading	It allows reading at high-speed movement.
4. Ease of miniaturization	It possesses characteristics that fit different
and diversification	applications, thereby providing a broad scope of
	application with a tendency for gradual expansion.
5. Environment resistance	It is unlike the traditional ID data dominated by the
	bar code or the manufacture's number, which does
	not resist dirt, needs a long time to be recognized
	under inclement weather or from which data cannot
	be continuously traced. In comparison RFID is heat-,
	water-, and impact-resistance; in fact, the tag can be
	maintained for more than ten years and can be accept
	writing for more than hundreds of thousands and
	even millions of time.
6. Repeated usability	Since it stores electronic data, RFID can be rewritten
	repeatedly.
7. Penetrability	Even if envelop with nonmetal or opaque material
	such as paper, lumber or plastic, RFID can process
	information, except when wrapped with material of

Table 2.1 Common RFID Technology Application

	metallic quality.	
8. Large data memory	It can accommodate increasing volume capacity;	
capacity	therefore RFID information will not be limited to be	
	capacity of bar code (Cheng et al, 2007). Owing to	
	its advantage of automatically recognizing and	
	capturing information, facilitating the safe reading of	
	much data at one time and its ability to be used	
	repeatedly, RFID demonstrates remarkable	
	application potential.	

2.1.2 Benefit of RFID system

Structure	Explanation
Operational benefits	1. Increased patient recognition
	2. Reduction of medical mistake
	3. Statistical information produced
	4. Reduced preparation time (supports the work of the medical staff)
	5. More affective data processing
	6. Improved work efficiency among medical care personnel and the administrator, thereby saving human resources
	7 Beduced costs doe to immension for the sources.
	7. Reduced costs due to improper treatment
	8. Effective management and application of medical resources.
	9. Work schedule and time frame analysis of medical personnel provided, which helps calculate cost and

Table 2.2 Benefit of RFID from existing system

		efficiency.
II	1	Real time access to leave backto in Connection
Users' benefits	1.	Real-time access to key health information
	2,	Increased information regarding patients hospitalized and
		transferred.
	3.	Faster and more convenient method for patient enquiries.
	4.	Enhanced tracking of patient services, thereby increasing
		rate of return.
	5.	Increased convenience in the hospitalization process and
		shortened hospitalization period.
	6 .	Improved safety
Organizational and	1.	Improved establishment of national medical information
environmental		(which gives the impetus for the development of the
benefits		Emergency Operation Center (EOC) policy)
	2.	Hospital publicity
	3.	Integrated medical industry services
	4.	Promotion of electronic case history development as
		standard practice
	5.	Improved internal communication within hospitals and
		enhanced service capabilities
	6.	Expanded scope of medical service, faster first aid
		treatment and increased business income.
	7.	More efficient management of waste, materials and
		biopsy material.

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2.1.3 Advantage and Disadvantage of Using RFID

Advantage	Disadvantage
1. RFID tags are very simple to	1. The RFID technology, though very
install/inject inside the body of	beneficial, is expensive to install.
animals, thus helping to keep a track	Small and medium scale enterprises
on them. This is useful in animal	find it costly to use it in their firms
husbandry and on poultry farms. The	and offices.
installed RFID tags give information	2. It is difficult for an RFID reader to
about the age, vaccinations and	read the information in case of
health of the animals.	RFID tags installed in liquids and
2. RFID technology is better than bar	metal products. The problem is that
codes as it cannot be easily	the liquid and metal surfaces tend to
replicated and therefore, it increases	reflect the radio waves, which
the security of the product.	makes the tags unreadable. The tags
3. Supply chain management forms	have to be placed in various
the major part of retail business and	alignments and angles for taking
RFID systems play a key role by	proper reading. This is a tedious
managing updates of stocks,	task when the work involves big
transportation and logistics of the	firms.
product.	3. Interference has been observed if
4. Barcode scanners have repeatedly	devices such as forklifts and
failed in providing security to gems	walkie-talkies are in the vicinity of
and jewelries in shops. But	the distribution centers. The
nowadays, RFID tags are placed	presence of mobile phone towers
inside jewelry items and an alarm is	has been found to interfere with
installed at the exit doors.	RFID radio waves. Wal-Mart, the
5. The RFID tags can store data up to	retail sector giant, has installed
2 KB whereas; the bar code has the	billions of RFID tags in their

Table 2.3 Advantage and Disadvantage RFID in existing system

ability to read just 10-12 digits.	products throughout the world and
	they have encountered such
	problems.
	4. The USA and Europe, for instance,
	have different range of frequencies
	that allow RFID tags to function.
	This makes it mandatory for
	international shipping companies
	and other organizations to be aware
	of the working pattern of other
	nations also, which can be very
	time-consuming.
	5. RFID technology has been referred
	to as invasive technology.
	Consumers are apprehensive about
	their privacy when they purchase
	products with RFID tags. Once the
	radio chips are installed in the
	product, the customer can be
	tracked and his personal
	information can be collected by the
	RFID reader. However, many stores
	have a facility that deactivates the
	RFID tags after the product has
	been purchased.

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