

BOOK INVENTORY SYSTEM USING RFID

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ABSTRACT

Radio-frequency identification (RFID) is a technology uses communication via electromagnetic waves to exchange data between a terminal and an object such as a product, animal, or person for the purpose of identification and tracking. Among the many uses of RFID technology is its deployment in libraries. This technology has slowly begun to replace the traditional barcodes on library items (books, CDs, DVDs, etc.). The RFID tag can contain identifying information, such as a book's title or material type, without having to be pointed to a separate database. The information is read by an RFID reader, which replaces the standard barcode reader commonly found at a library's circulation desk. In this project, RFID technology will help the management of the library and also the customer for library in order to manage the inventory and all the transaction process happen every day. This technology also reduces time and increase the efficiency. Therefore, it will make the data of the library can be view and manage more systematically by the administrator or staff.

ABSTRAK

Pengenalpastian frekuensi radio (RFID) adalah merupakan satu teknologi yang menggunakan komunikasi melalui gelombang elektromagnetik untuk pertukaran data melalui satu terminal dan satu objek seperti produk, haiwan atau orang yang bertujuan sebagai pengenalpastian dan pencarian. Di antara kegunaan teknologi RFID adalah penggunaannya di perpustakaan. Teknologi ini semakin lama semakin digunakan bagi menggantikan penggunaan tradisional iaitu kod bar pada alatan perpustakaan (buku, cakera padat, cakera keras, dll.). Tag RFID boleh mengandungi informasi pengenalpastian, seperti tajuk buku atau jenis bahan, tanpa perlu menunjuk pada pengkalan data yang berbeza. Informasi tersebut dibaca oleh pembaca RFID, yang mana menggantikan pembaca kod bar yang kebiasaannya boleh didapati di kaunter sirkulasi perpustakaan. Di dalam projek ini, teknologi RFID membantu pengurusan perpustakaan and juga pengguna bagi perpustakaan untuk menguruskan inventori and kesemua proses transaksi yang berlaku setiap hari. Teknologi ini juga mengurangkan masa dan meningkatkan kecekapan. Oleh kerana itu, penggunaan teknologi ini secara langsung membolehkan data sesebuah perpustakaan itu dilihat dan diuruskn deng lebih sistematik oleh pentadbir atau staf.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Even though we have already developed high end devices such as PDA, iPhone and much more to create an efficient network, but then we still need to go through the book manually in order to do research and assignment. It seems that we still need books to refer to in spite of we already have internet.

To fulfill the necessity of the community, yet we still build the library and bookstore to provide enough references. As we can see, Universiti Malaysia Pahang (UMP) also has its own library and some faculty such as Faculty of Computer Science and Software Engineering (FSKKP) has their own bookstore to provide the best references for their staff and student. Our library has their own system to manage the inventory of the books and all items in the library. This system makes the management of the library become more efficient.

But, the situation not same as what is happening at Perpustakaan Awam Yan, Kedah. Most of the time, this library will buy a lots of book and at the same time the staff also have to manage the order of the book in the shelves, the check-in and check-out of the book. While doing such work, the important things that they have to be concern is to how to manage the book inventory efficiently?

The Book Inventory System Using RFID (RFID is stand for Radio Frequency Identification) is developed to help this community in handling the book inventory properly. Thus, this system can help and make the works much easier. It also helps in the security matter.

1.2 Problem Statement

Books are important materials for teachers, lectures and students and even to the community as it can be references for their study and thesis and also to gain knowledge. However, because of the compact schedule in their lifestyle routine, they don't have so much time to spend in library. Meanwhile, for student, they have to do so much research for their assignment and do some reference. On the other hand, the communities also love to read books with all genres.

The librarian staff also facing some difficulty while handling the book inventory. There are so many books to be managed and there must be an effective way to manage the book inventory so that it is easier for both staff and

patron. For librarian, they still used the traditional method in which they manage all the transaction in manual way. We also considered the security while managing the book inventory.

As a solution for this matter, Book Inventory System Using RFID is developed to fulfill the needs of a system that can manage and handle the book inventory efficiently. It is the latest technology to be used in library so that we can enhance the security system and at a mean time managing the book inventory effectively.

1.3 Objective

The purpose in developing this Book Inventory System Using RFID is based on several objectives. Those objectives are:

- i. To develop an automated book handling in library in term of transaction process
- ii. To computerize system of book handling in library
- iii. To calculate fine in easier way due to late returning of book

1.4 Scope

The project scopes that have been identified are the data, system environment and user module. There are two (2) types of users in this system which is the patrons which mean the user or customer of the library and the library administrator. Those users are the communities of the district of Yan, and also who visit the library. The system will cover all the codes of the books and even the check-out or check-in of the books. This system will be developed using Visual Basic for Graphical User Interface (GUI). As the system will connect to the hardware, this system will use passive RFID tags.

1.5 Thesis Organization

This thesis is divided into 6 chapters and each chapter is devoted to discuss different issue in the project. Chapter 1 will discuss on introduction to the system. The problem statement, objective and scope will be identified. Chapter 2 will discuss about all the research and literature review that related to the project. Chapter 3 will discuss the approach and framework for the project. It explains about the method that is implemented while designing the system. Justification about hardware and software that used to develop the system will also be discussed. Chapter 4 will document all processes that involve in the development of this project, generally, this chapter explains about the designed project development. Chapter 5 will discuss about the results and data analysis that had been acquired. The result included result analysis, project limitation and

suggestions for project enhancement. Chapter 6 will briefly summarize the overall developed project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Chapter II is the important chapter for any project that will be develops. The purpose of this chapter is to present a selected literature review, which is very important for the research. This chapter also describes and explains on the literature review carried out on the system that be used in developing this system. Besides that, previous research also will be discussed in this section and at least three existing system that being used in to make as a research which is related to this system will be explained and compared to highlight the differences.

For the project required section, where all the requirements such as software and hardware as well as the operating system requirement will be listed so that developer can understand all the features that are available in the requirement before proceeding to the proposed project.

Finally, the last section of the chapter discusses the project schedule and milestones. In this section, a Gantt chart will be attached together with this section. The Gantt chart listed details of all task and activity required during the progress of the project and the conclusion section will end the entire explanation for this chapter.

2.2 Literature Review

Literature review is aims to review the critical points of current knowledge on a particular topic. Therefore, the purpose of the literature review is to find, read and analyze the literature or any works or studies related to this system. It is important to well understand about all information to be considered and related before develop this system.

For this project, some researchers have been done to understand the concept and purpose of RFID in the book inventory, system, programming language, protocol language, and existing system that related to this project.

2.2.1 Domain

Every project has its own domain. In the Integrated Security System for Industry: Module on Book Inventory System using RFID for library protection, the domain for the project is Radio Frequency Identification (RFID) which refer to small electronics devices that consist of a small chip and an antenna.

RFID is commonly used of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

The FRID device serves the same purpose as a barcode or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And just as a barcode or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information.

Unlike ubiquitous UPC barcode technology, RFID technology does not require contact for line of sight for communication. RFID data can be read through the human body, clothing and non-metallic materials.

2.2.1.1 Comparison between Data Capture Technologies

A significant advantage of RFID devices over the barcodes approach in terms of its data capture technologies is that RFID device does not need to be positioned precisely relative to the scanner. We're all familiar with the difficulty that library checkout staff sometimes have in making sure that a barcode can be read. Barcode also can lead to the inventory inaccuracy.

On the other way, traditionally we used the manual based approach. Although the manual based approach could well identify the different product type, however the data captured is not readily available in electronic format for other purpose, unlike the barcode approach.

The main problem that we can highlight if we are using the manual approach is that it will give the major problem to the staff. If the employ hire the new staff, inexperienced manual staff may have problems identifying items types in which case the use of barcode can help the identification process considerably. For example, a manual staff could use a handheld barcode reader to capture the barcode number on the item and this information could be electronically processed to provide immediate description about particular item type via the handheld reader itself.

Without RFID however, it will be difficult if not impossible for the manual staff to uniquely identifying all the items in the library. In contrast, RFID devices will work within a few feet (up to 20 feet for high-frequency devices) of the scanner. The main differences between data capture approaches are