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JUDUL: **SMART CARD APPLICATION IN UNIVERSITY AREA**
SESI PENGAJIAN: 2004 - 2007
Saya : NURUL AIN BINTI BURHANUDDIN

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SMART CARD APPLICATION IN UNIVERSITY AREA

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This report submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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DECLARATION

I hereby declare that this project report entitled

SMART CARD APPLICATION IN UNIVERSITY AREA

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : ..... Date: 25/10 / 2007

(NURUL AIN BINTI BURHANUDDIN)

SUPERVISOR : .....Date: 25/ 10 / 2007

(DR. ANTON SATRIA PRABUWONO)

DEDICATION

To my beloved Family, I love you all.

To my great friends, thank you.

To my supportive supervisor Dr Anton Satria Prabuwono

and

To all UTeM's lecturers and staffs, UTeM Boleh!

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ABSTRACT

Smart Card Application in University area is about project that developed for students and staff to use. This system developed specially for students and staffs (lecturer) as an alternative tools to given new information system for students. The main objective of this system is substitute manual method on announcement for student activities or classes that available. The major software used to develop this project is Macromedia Dreamweaver MX 2004, Optical Character Recognition and Appserv (Apache, database and PHP). Upon students place the matrix card, an item with a label that consists of the serial number of the matrix card, will be scan using a digital barcode scanner. By using Optical Character Recognition software, the digit number will go through process of extracted data to the binarization. In the scan result, the barcode ID get from the student matrix card will be compared with the pre-safe data to catch the information and listing all the information available. This application will be developed with the concept of Human –computer interaction (HCI) where the application will be designed using some fundamental interaction skills. This system is easy-to-use and user-friendly interface to ensure smooth navigation to lecturers and students use the application. This system successfully help the university's mission in preparing student for the application of Internet Technology and use of matrix card in order to enhance information literacy among the university community between lecturers and students.

ABSTRAK

Smart Card Application in University Area merupakan projek yang dibina khas untuk pelajar-pelajar universiti dan juga para pensyarah. Tujuan sistem ini dibangunkan adalah memberikan kaedah alternatif dalam pemberitahuan informasi baru kepada para pelajar. Objektif utama system ini adalah untuk menggantikan kaedah pemberitahuan mana-mana aktiviti dan kelas yang ada. Perisian yang digunakan didalam membangunkan projek ini ialah Macromedia Dreamweaver MX 2004, Pengenalan Ciri Optik (OCR) dan PHPAdmin (pangkalan data). Apabila pelajar melalukan kad matrix, sesuatu benda yang bertanda nombor bersiri kad matrix akan diteliti menggunakan kod bar pengimbas. Penggunaan Pengenalan Ciri Optik (OCR) ialah dimana ia akan menterjemahkan nombor siri yang ada di matrix kad pelajar ke bentuk yang lebih difahami oleh system computer iaitu didalam bentuk binari. Sistem ini akan mengesan dan mengambil data-data dari pangkalan data untuk para pelajar melihat informasi yang ada. Tambahan, aplikasi ini juga dibangunkan berkonsepkan komunikasi antara komputer – manusia (HCI) dimana aplikasi ini akan direka berdasarkan kemahiran manusia. Sistem ini senang digunakan dan mempunyai antara muka mesra pengguna bagi memastikan lancar dalam melayari bagi pensyarah dan pelajar menggunakan aplikasi tersebut. Sistem ini berjaya menolong misi universiti dalam persediaan pelajar untuk aplikasi Teknologi Internet dan pengunaan kad matrix di dalam memenuhi peningkatan kebolehan informasi di kalangan komuniti universiti antara pensyarah dan pelajar.

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CHAPTER I

INTRODUCTION

1.1 Project Background

The project of Smart Card Application in University Area is about to develop an information system via matrix card bar code reader and touch screen to use the system. The system will appear a list of activities that held for the current day in university area. The students able to know the information by using the system if there is class that cancelled or going on. This system provided for lecturers given notification to all students about class and for the staffs of university to upload the activities.

Students may view activities were held and classes by using their matrix card. The specification about this application is using Optical Character Recognition (OCR), is a type of computer software designed to translate images of handwritten or typewritten text (usually captured by a scanner) into machine-editable text, or to translate pictures of characters into a standard encoding scheme representing them (e.g. ASCII or Unicode). OCR began as a field of research in pattern recognition, artificial intelligence and machine vision.

Though academic research in the field continues, the focus on OCR has shifted to implementation of proven techniques. Optical Character Recognition refers to the branch of computer science that involves reading text from paper and translating the images into

a form that the computer can manipulate (for example, into ASCII codes). An OCR system enables you to take a book or a magazine article, feed it directly into an electronic computer file, and then edit the file using a word processor (Stephen et al, 1999).

All OCR systems include an optical scanner for reading text, and sophisticated software for analyzing images. Most OCR systems use a combination of hardware (specialized circuit boards) and software to recognize characters, although some inexpensive systems do it entirely through software. Advanced OCR systems can read text in large variety of fonts, but they still have difficulty with handwritten text.

1.2 Problem Statements

Generally, in university does not provide any particular system or application that can view list of activities under university or any class available for students. For example if lecturer takes emergency leave, the class might be cancelled and he/she should contact the students. For this purpose, there might problem occurred such as student representative left the phone or any possibility that comes to loss the information about the class available. Recently, university's staff will stamp on board or make a banner to tell the students for any courses available.

1.3 Objective

The objectives of develop this system/application are:

- To build user-friendly interface which suitable for staffs and lecturers which is an information system and lecture management.

- To build a system for staffs and lecturers in uploading their notification and activities for student. The system display interface system between software application and barcode reader. The system will be viewed by the students in university area.
- To create portable and reliable system for student and staff in university to use by using barcode ID generated from student matrix card.

1.4 Scope

a) Web-Based System using PHP Script

A portal for lecturer and staff of university for upload the activities or make any announcements. This portal included button for teachers or staffs to upload the activities or classes which actually to inform the students about class cancellation.

b) Communication Between Bar Code Reader and Touch Panel to the System

System will appear activities and classes available on that current day. On the screen will appear name of the user at the above of the screen. The screen will display a list of activities and classes were going that ease for students to view. Figure 1.1 shows system architecture will be developed in this project. As shows in the Figure 1.1, upon scanning the student matrix card, an item that consists of serial number of matrix card, will be scan using a digital barcode scanner. The process will extracted data from binary to the digital and compare with pre-safe database.

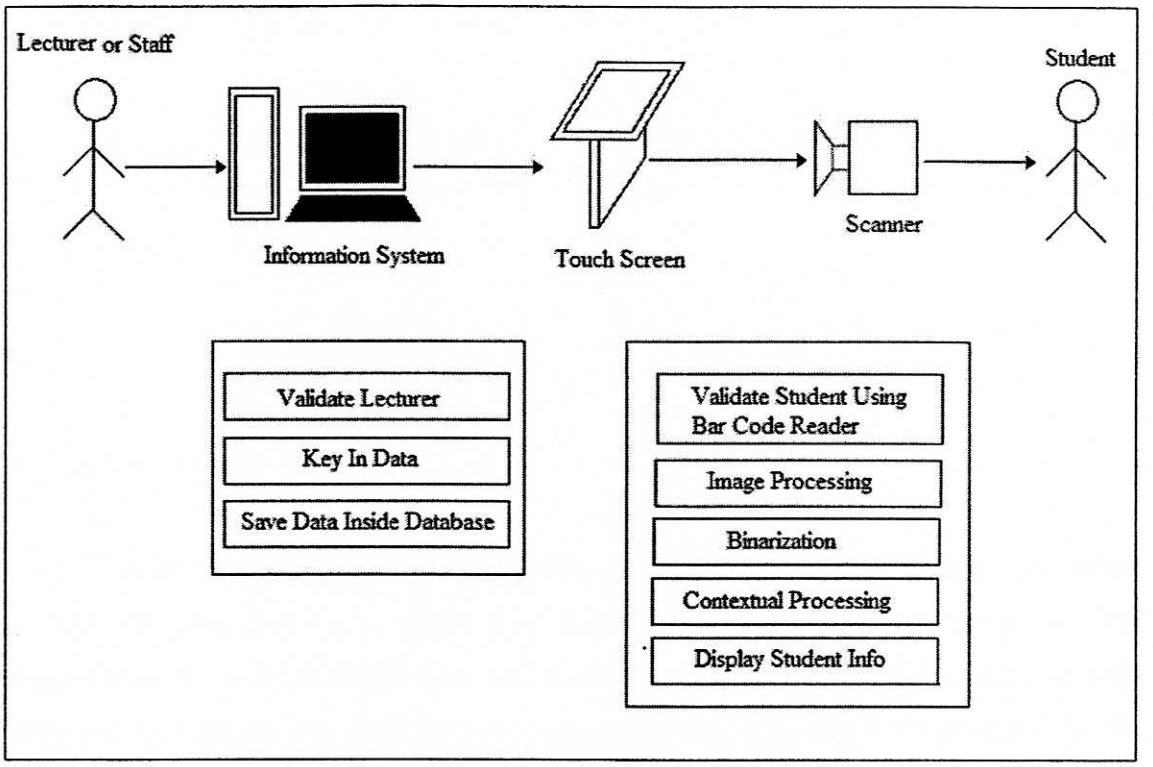

Figure 1.1: System architecture

1.5 Project Significance

The system provides class information and lecture management which staff may handle by using the system to make any announcements or notifications for all students. The use of this system is efficient and beneficially for those people in University area which providing more reliable and portable system. This system is easy to use that suitable for any students find more information related activities and also classes to be held on that day.

1.6 Expected Output

The expected output from the system is it able to assist the target user, i.e. the lecturers and students. The system assists the student to give the latest announcement from their lecturers.

1.7 Conclusion

Smart Card Application in University Area is a system that uses a web-based system structure, bar code reader and touch screen panel. Lecturers key in the announcement inside the application, and student access the data based from their matrix card bar code to retrieve their lecturer announcements. The touch screen panel is an interactive gadget to help student to use the application. For the next activity to be develop are to collect the project data requirement such as the literature review, project methodology, hardware and software requirement. This data will help the project development process and analysis.

Next chapter will focusing on the literature review and project methodology that will be implemented in this system. All the technique approaches, tools and requirement for this project also will be explained in detailed in the next chapter.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The details description of literature review and project methodology will be shown in this chapter. Literature review means searching, collecting, analyzing, studying and write conclusion from all debates and issues raised in relevant body of literature. For this project literature review will focuses on the research of various theory and basic network knowledge that related with barcode mechanism and Optical Character Recognition (OCR) mechanism which is the main feature of system. Relevant cases studies carry out over the similar existing system are also will be documented in this section along with the analysis result observed.

Moreover, this chapter also will discuss in depth on the proper project methodology in carrying out the project successfully. The project methodology is an important part that needs to collect, analyses, and distribute responsibility and estimates outcomes. The project methodology will also encompass development methodology and technique chosen along with hardware, software and network requirement.

2.2 Facts and Findings

This section will converse on the fact finding theory and concept that have been adopted to collect relevant information to be used in project development. The significance and contributions of conducting research on the related survey areas are also outlined.

2.2.1 Domain

In order to fully understand the process role applied in the Optical Character Recognition and bar code technology, the following concepts and theories are required be comprehend to enable an effective and practical system development process.

A) Barcode

The barcode pattern began with investigate and issued by inventor Joseph Woodland and Bernard Silver. Both of them are the graduate student at Drexel Institute of Technology which has joined to work on a solution for a local food chain store owner which requires method of automatically reading product information during checkout in 1984. The preliminary prototype is build but the system was too expensive and unstable. In October 20 of 1949, Woodland and Silver have invented a pattern application for the "Classifying Apparatus and Method". The pattern was issued on October 7, 1952 (Mary, 2006).

The first barcode reader was build by Woodland and Silver too. The invention of the laser makes cost of barcode reader is decrease and with using integrated circuit made decoding of the scanned barcode practical and commercially in 1960's. By 1970, a company called Logicon Inc has writes Universal Grocery Products Identification Code (UGPIC). Woodland invented the U.P.C symbol set (Universal

Product Code) which base on UGPIC in 1973. The first product to have a barcode is located at Marsh's supermarket in Troy, Ohio (Mary, 2006).

"A barcode (also bar code) is a machine-readable (using dark ink on white substrate to create high and low reflectance which is converted to 1s and 0s) representation of information in a visual format on a surface. Originally barcodes stored data in the widths and spacing of printed parallel lines, but today they also come in patterns of dots, concentric circles, and hidden within images. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software. Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry." (Wikipedia, 2006)

The algorithm that use in coding and decoding barcode is binary system. In binary system, they are only 2 numbers used, 1 and 0 which '1' representing each bar and '0' representing spaces between bars (Leibowitz, 1999). Figure 2.1 shows barcode encoded in Code 128. Figure 2.2 shows barcode encoded in data matrix 2D

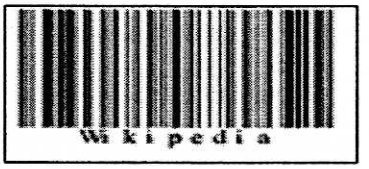

Figure 2.1: Barcode encoded in code 128

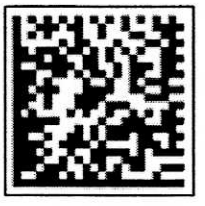

Figure 2.2: Barcode encoded in datamatrix 2D barcode

Barcode technologies are now commonly sight on most consumer products. The administrator feature on barcode product is relatively cheap and simple to a wide variety of situations. The barcode systems can be used in a widely situations such as retailing, administration, and personal identification.

B) Optical Character Recognition

Optical Character Recognition (known as OCR) is a type of computer software designed to translate images of handwritten or typewriter text into machine-editable text, or ton translate pictures of character into a standards encoding scheme representing them (e.g. ASCII or Unicode) (Stephen et al, 2006)

The new technology of OCR was started in 1950's when a robot that can read and write – GISMO, was created by M. Sheppars. Whereas, in the year 1956, J. Rainbow has created a prototype machine that can recognize all the capital letters from a typing machine. The machine that created by J. Rainbow has the ability to recognize 1 character a minute. Start from the year 1960's, some companies like IBM, Recognition Equipment Inc., have started to market OCR system. At the beginning state of the development of OCR system, a few standards have been created. Some examples of these standards are list below:

- Character Set for Optical Character Recognition (OCR-A).ANSI X3.17-81
- Character Set for Optical Character Recognition (OCR-B). ANSI X3.49-75
- Optical Character Recognition (OCR) Character Position. ANSI X3.93-81

Generally, commercial system OCR can be divided into two major groups. The first group, is specialist task reader, and the second group, is general purpose reader. The system with specialist task reader is used on specific document only,