STI   SYSTEM

(SVRS)

SITI AISYAH BINTI ABD MUTALIP

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Abstrak

Faktor keselamatan di universiti adalah sangat penting. Untuk memastikan keselamatan kawasan universiti dan kampus, Bahagian Keselamatan UMP memerlukan sistem untuk merekodkan maklumat pelajar termasuk maklumat kenderaan mereka. Sistem pendaftaran kenderaan dibangunkan untuk menyimpan maklumat semua kenderaan berdaftar pelajar di dalam kampus. Objektif projek ini adalah untuk membangunkan sistem pendaftaran kenderaan pelajar dalam talian dan menghasilkan pelekat kenderaan universiti pegawai itu. Projek ini akan memberi tumpuan kepada menguruskan semua maklumat pelajar dan kenderaan dan juga menjana kod QR pada pelekat kenderaan berdasarkan pada maklumat yang didaftarkan dalam sistem seperti nombor matrik pelajar dan nombor plat kenderaan mereka. Sistem ini dijangka membantu kakitangan keselamatan untuk mengesan sama ada kenderaan itu didaftarkan atau tidak didaftarkan dengan mengimbas kod QR pada pelekat dan membandingkan maklumat dengan pemilik kenderaan dan nombor matrik . Pendaftaran kenderaan pelajar dibangunkan dengan menggunakan PHP dan Xampp untuk menjalankan pelayan MySQL .

Abstract

Safety factor in the university is very important. In order to make sure the safety of the university and campus areas, UMP Security Department will need a system to record the information of student including their vehicle's information. Vehicle registration system is developed to keep information of all student registered vehicles in the campus. The objective of this project is to develop an online student vehicle registration system and produce the official university vehicle's sticker. This project will focus on managing all student and vehicle information and also generate QR code on vehicle sticker based on the information that is registered in the system such as student matric number and their vehicle plate number. The system is expected to help the security staff to detect whether the vehicle is registered or unregistered by scanning the QR code on the sticker and match the information with the owner of vehicle and matric number. The student vehicle registration is developed using PHP and Xampp to run the MySQL server.

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CHAPTER 1

INTRODUCTION

1.1   Introduction

QR code is stands for Quick Response code and the trademark for matrix barcode or two-dimensional barcode. Originally the QR code is designed for tracking purposes in automotive industry in Japan. It is extremely useful, since they can hold between 4K − 7K worth of characters. QR code is similar to the traditional barcode that can be see on products that store a lot of information such as phone number, name, company information, address, any related information alongside its alpha-numeric text data and in-store product labeling and marketing. QR code has been utilized extraordinarily in the world of marketing. It brings such a convenience to the industry and a huge potential for easily sharing information between marketer and consumer.

The difference between barcode and QR code is the barcode only holds information nicely in horizontal direction, while QR code can do both vertically and horizontally. A QR code can carry up to some hundred times the amount of information a conventional a barcode capable of. It is capable of being read in 360 degrees from any direction. QR code typically used to store and transmit data by using smartphone that has camera and QR code reader and scanner application to display the information.

QR code technology that will be implement into vehicle management system is very useful for security management to recognize registered vehicle's information. Registered vehicles can be identified by the smartphone that act as a scanner to display registered vehicles information. It can help security management to block the unregistered vehicles.

1.2 Problem Statement

Unregistered vehicle produced problem when students did not register their vehicle and might be using or duplicating other registered vehicle sticker. Security guard cannot identify if the sticker is an original registered vehicle sticker and if it is belongs to the vehicle or not. Duplication of vehicle stickers will avoid the unregistered vehicle being block by security guard for entering UMP.

1.3 Objectives

a. To develop a student vehicle registration system and produce the official university vehicle's sticker.

b. The system will generate the QR code on vehicle sticker based on the information that is registered in the system.

c. To avoid vehicle's sticker duplication or the use of other vehicle sticker by the unregistered vehicle.

1.4 Scope project

a. This system will be use by UMP student.

b. UMP Security Department will be act as admin to keep all the information of registered vehicles and produce vehicle stickers.

c. Admin will approve the registration of vehicle then staff and student can get registered vehicle sticker that has QR code that will keep the matric number of the student and vehicle plate number.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of Student Vehicle Registration System

Campus and university always emphasize the safety factor in their area. In order to make sure the safety of student, University Security Department will need to record the information of student including their vehicle information. Student Vehicle Registration System is developed to keep information of all registered vehicles in the campus. All student need to register their vehicles in order to get the registered university vehicle's sticker from the Security Department. Registered vehicles can be recognized easily by the Security Department staff through the registered vehicle sticker, if the QR code is used to hold registered vehicle information. Currently, the existing UMP student vehicle system cannot detect the unregistered vehicle that duplicate and using other registered vehicle sticker.
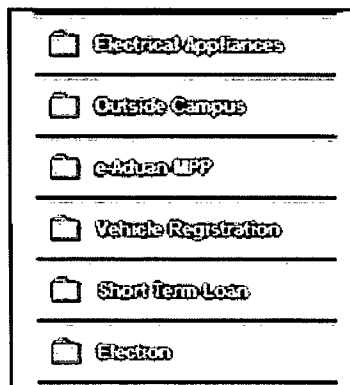
Figure 2.1: The section for Ump student apply the vehicle registration form

Figure 2.2: The interface of the student profile inside the vehicle registration section

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APPLICATION FOR STUDENT STICKER

1. Fill yourself / vehicles in e-comm
2. Owner truth of the vehicle is allowed to apply.
3. An applicant / owner is allowed per vehicle.
4. First Year students are not allowed / not eligible to apply.
5. Sticker valid for one year (one session) only.
6. Payment is made at the Bursary (Reception and Student Financial Unit).
7. Come to the security office and submit together with matric card, driving license and a copy of the original grant / current vehicle registration. (no need to photocopy)
8. Show sticker on a conspicuous part of the security guards.
9. Bring along a license and matric card while driving / riding.

Figure 2.3: The instructions to student

Student ID : CA10085
Student Name : SITI AISYAH BINTI ABD MUTALIP
Student I/C no. : 910221125492
Course : SARJANA MUDA SAINS KOMPUTER (SISTEM KOMPUTER & RANGKAIAN) DENGAN KEPUJIAN

Application Form

Date : 24-10-2013

Academic Year : 2013/2014

Vehicle's Type : Car

Brand :

Registration No. :

Colour :

Roadtax Valid Date :

Driving Lisence's Valid Date :

Driving Lisence's No. :

Class :   e.g A, D, F

Telephone No. :

Current Address/UMP Hostel :

Confession :   Dengan ini saya akui bahawa permohonan ini dibuat atas kenderaan saya sendiri.
Saya bersedia untuk diambil tindakan tata tertib universiti sekiranya pengakuan ini tidak benar.

Submit   Reset

Figure 2.4: The form student need to fill in with their information

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2.2   The History of QR codes

QR codes which stands for Quick Response code is the trademark for matrix barcode or two-dimensional barcode. It can store a lot more information per unit area. It was originally designed for the automotive industry in Japan.

In the 1960's when Japan entered its high economic growth period, supermarkets selling a wide range of commodities from foodstuff to clothing began to spring up in many neighborhoods. The invention of barcodes provided the solution to the problem where cash registers that were then used at checkout counters in the stores required the price to be keyed in manually. POS system (Point of Sales System) was developed, in which the price of an item was displayed on the cash register automatically when the barcode on the item was scanned by an optical sensor and at the same time the information on the item was sent to the computer. However, while the used of barcode spread, their limitations became apparent as well. One of the limitations is a barcode can only hold 20 alphanumeric characters of information.

Masahiro Hara is the person that in charge of the development of QR codes faced the greatest challenge for his team to create codes that can pack as much information as possible into the codes and how to make reading their code as fast as possible. Through barcodes, information is coded in one direction as one dimension only. With two dimension codes, information is coded in two directions which the codes can be read across, up and down. Hara has strong desire to develop new two dimension code that could be read easily and as well as being capable to hold a great deal of information.
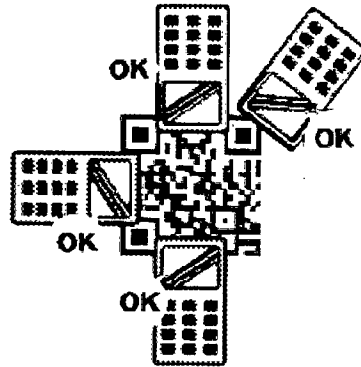
Figure 2.5: The position detecting pattern made up of square

Before Hara and his team tried to build the square pattern, they found out that a position detection patterns is used in a code and there is a similar looking mark nearby, the code reader or scanner may mistake it for the position detection patterns. To avoid that error they need to use the position detection patterns that are truly unique. They finally decided to do an exhaustive research and survey of the ratio of white to black areas in pictures and symbols printed on magazines, fliers and cardboard boxes and so on after reducing them to patterns with black and white areas. Eventually they came up with the least used ratio of black and white areas on printed matter. They finally found that the ratio was 1:1: 3: 1:1. This was how the widths of the black and white areas in the position detection patterns were decided upon. In this way, the orientation of their code could be determined regardless of the angle of scanning by searching the unique ratio which could be any angle out of 360°.

The development of project was initiated after one year and half. After repeated so many trial and error, a QR code is capable of coding about 7000 numerals with the additional capability to code Kanji characters. This QR code also can be read more than 10 times faster than other codes.

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2.3 Implementation of QR code in Student Vehicle Registration System

The current student vehicle registration system only used a sticker that is not fully printed. The problem is the sticker can be duplicated by the unregistered vehicle's owner. To make sure the safety of UMP areas, a student vehicle registration system can be develops to enhance the current system. A new type of vehicle's sticker can be created. The current sticker can be replaced with the vehicle sticker with a QR code. The information such as student vehicle plate number and student matric number can be encoded inside the QR code. The UMP Security Department staffs can scans all vehicles that entering UMP and will be able to detect the unregistered vehicles if the information in QR code is different with the vehicle plate number.

2.4   How does the QR code works?

A QR code is faster to be read than other two-dimensional code like a barcode because it contains the large square patterns in the corners that are used for position detection patterns. The patterns are used to detect the angle and the outer shape of the symbol. When a reader such as smartphone that have application for QR code scanner, it scans a symbol and detects these patterns. Once the position patterns have been detected the scanner can rapidly read the inside code in all directions. The inside code consists of several small blocks where the information is encoded. The decoding speed of the QR code can be 20 times faster than the others two-dimensional symbols (Soon, 2008).

QR Code(2D Code)   Bar Code

Contains   Contains
data   no data

Contains data

Contains data
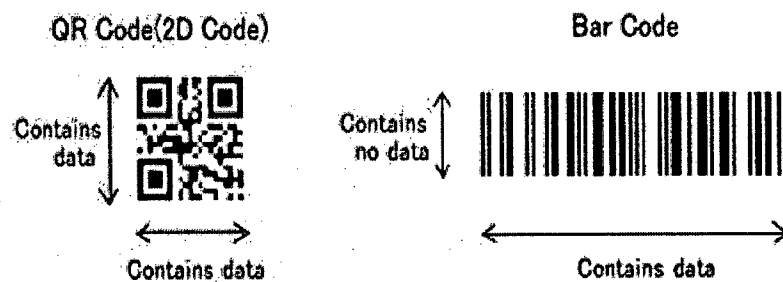
Figure 2.6: QR code compared to barcode

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QR code can be generated using free online QR code generators. They can be printed on plain paper using an ordinary printer and attached to any object. Currently, we often see in the media, like TV show programs and newspapers that commonly used QR code to hold URLs or other small information like e-mails and phone numbers. All that information can be read using mobile phone and any devices that support the appropriate QR code scanners. Once the information is stored in the form of QR code, it can be decoded and shows the content that is retrieved from a remote server, facilitating mobile navigation. Besides that, QR code can have other several applications.

2.5   The elements in QR code

Figure 2.7: The elements in QR code

The elements contained in a QR code are the following:
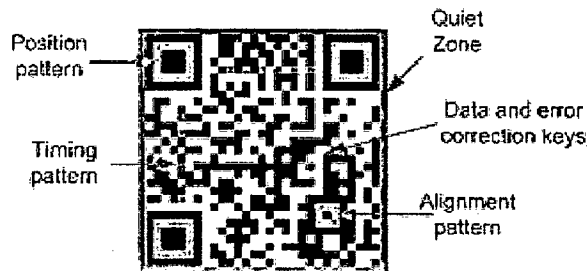
a)   **Position Detection Pattern.**

Three big squares in the corners used for detecting the position, the size and the angle of the QR code.

b)   **Alignment Pattern.**

An alignment pattern is used for correcting the distortions of the QR code. These distortions could occur for when attaching the codes onto a curved surface.

c)   **Quiet zone.**

A margin space that makes easier to detect the QR code when it is scanning by a scanner. At least four cells are required for the quiet zone.

d)   **Data Area.**

The area in the QR code that contains the data would be encoded in binary numbers. The data area also includes Reed-Solomon codes to provide error correction functionalities.

e)   **Timing Pattern.**

It consists white and black modules arranged alternately and placed between two position patterns. It is used to determine the central coordinate of each cell in the QR code.

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		Maxi Code	Data Matrix	PDF417	QR code
Developer		UPS	RVSI Acuity CiMatrix	Symbol Technologies	Denso Wave
Type		Matrix	Matrix	Stacked barcode	Matrix
Data Capacity	Numeric	138	3116	2710	7089
	Alphanumeric	93	2355	1850	4296
	Binary	-	1556	1018	2953
	Japanese, Chinese or Korean characters	-	778	554	1817
Main features		High-speed scanning	Small size	Large capacity	Large capacity, small size, high-speed scanning.
Main applications		Logistics	Factory automation	Office automation	All categories

Table 1: The comparison between QR code and the other two-dimensional codes

2.7 Comparison between vehicle registration systems and proposed system

Currently, UMP is using an online vehicle registration system where UMP students make their registration by fill in the information required including vehicle information to get the official UMP vehicle sticker. The advantage of the current system is all registration information is saved as records for future reference. There is a problem that this system cannot solve where the unregistered vehicle used fake sticker by duplicating or using other registered vehicle sticker to enter UMP without being caught by UMP security staffs.

Another available system is vehicle registration system with RFID car identification system. This system using RFID (radio frequency identification detection) to enables vehicle to check-in and check-out at one time. It will keep and record the information such as what time and date all vehicles that going in and out. This system RFID chip tags can be used repeatedly. The disadvantage of this system is as the staff number increase, we will be need a lot of RFID chip tags and this will make this system costly.

The proposed system is UMP Student Vehicle Registration System. This new system will be able to generate the official vehicle stickers that have the QR code to keep the information of the vehicle and the owner that is registered in the system. This new system will solve the problem that faced by the security staff, where the unregistered vehicle can be detected by scanning the QR code sticker on the vehicle to get the information which are the students matric number and plate number of the vehicle.

Systems	Function	Advantage	Disadvantage	Technology devices used
UMP Vehicle Registration System	- Online vehicle registration	- Keep all vehicle registration information	- Vehicle sticker can be duplicate easily	
Vehicle System with RFID Car Identification System	- Vehicle registration system with RFID that enables vehicle to check-in and check-out	- Does not require direct contact or line-of-sight scanning and tags can be use repeatedly	- Need a lot of chip tags if the number of staff increase	- RFID chip tag - RFID reader - RFID antenna
Vehicle Registration and Parking	- Online Vehicle Registration	- Keep vehicle registration information and produce valid parking sticker	-	-
Proposed System (UMP Vehicle Registration System)	- Online Vehicle Registration System - Generate QR code stickers to keep registered vehicle information	- The unregistered vehicle can be detected by scanning QR codes sticker on the vehicle	-	- QR code scanner (smartphones)

Table 2: Comparison between vehicle registration systems

CHAPTER 3

RESEARCH METHODOLOGY

Every project development includes discussion of the methodology. Methodology is use as the solution tree to the project. It is a set of guidelines, standards and processes that is involved and followed explicitly in order to produce a product or software. In order to make the system to function as same as the real system, the proper and suitable choice of the equipment used is to be considered. This chapter will lay down the details about the Student Vehicle Registration System with QR code vehicle sticker.

3.1 Introduction

Methodology is a set of guidelines, standards and processes that is involved and followed explicitly in order to produce a product or software. It is also followed in an organization to conduct all the steps necessary to analyze, design, implement and maintain information systems. Methodology is very important while developing certain software. It acts as a guidance that may affect the entire progress of the project. A suitable methodology usage may guide the developer through the whole project in order to meet the user requirements.

3.2 Project development phases

When a system is develop, it is important through a sequence of steps to ensure the right quality and in accordance with the specifications laid down from the start through to the testing and evaluation. The methodology is an important method during the development of the system. One of the advantages of using the methodology is able to assist the process of system development is done in stages and more systematic.

The process involved in the methodology is system development life-cycle (SDLC). SDLC is suitable in supporting various system project types such as new system project development, rewrites of the existing systems, maintenance, package selection and system conversions. It is the overall process for developing information systems that is divided into five phases: planning, analysis, design, implementation and testing. The systems development life-cycle concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both.

The process to develop the student vehicle registration system will follow the system development life-cycle (SDLC) using waterfall model which is the classical and the best known theoretical, a sequence of stages in which the output of each stage becomes the input for the next. Waterfall is one of the SDLC which a sequence of stages in which the output of each stage becomes the input for the next. These stages can be characterized and divided up in different ways. Five phases that involved in developing the system are:
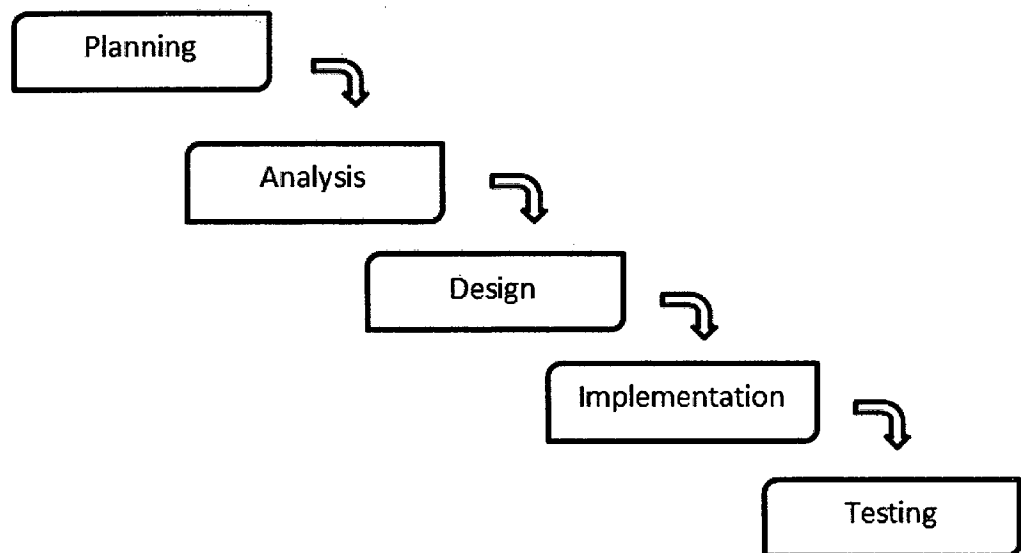
Planning

Analysis

Design

Implementation

Testing

Figure 3.1 SDLC Waterfall model