FINAL YEAR PROJECT:

VEHICLE RECOGNITION SYSTEM

by

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Dissertation submitted in partial fulfillment of

the requirement for the

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(Business Information System)

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CERTIFICATION OF APPROVAL

Vehicle Recognition System

by

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Approved by,

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UNIVERSITI TEKNOLOGI PETRONAS
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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

MOHAMAD SHAHRUL AMRI BIN ZAINUDDIN

ABSTRACT

The goal of this dissertation is to explain in detail the whole progress and overall process of the Vehicle Recognition System project in detail in term of completing the Final Year Project II. This report includes the background of study that describe about what the system is about, the problem statement with the current method, the objectives of developing the new system and the scope of study for the first chapter. In the Literature Review section, this report will explain the topic that is related about the system such as barcode methodology and symbologies. It also explains the programming language use as the database and the tools needed for implementing the project. In methodology section, it's described the method use for creating the system, the flow of that system and the tool used. The results and discussions section discuss in detail the requirement of the system before the system can implemented and lastly, the conclusion section will elaborate where the author concludes about the system that is to be developed briefly. It is important to develop this system as it will help the security to handle the UTP's environment well.

ACKNOWLEDGEMENT

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Firstly, many thanks to the Universiti Teknologi PETRONAS and the Final Year Project Coordinators especially, that have coordinated and made the necessary arrangements, especially in terms of the resource, for this study.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1. The System Interface:

2. The System Code:

3. Project Schedule For FYP

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

UNIVERSITI
TEKNOLOGI
PETRONAS

CHAPTER 1: INTRODUCTION

1.1 Background of Study

The Vehicle Recognition System is a security system that will recognize the vehicles registration status. This system will be developed to upgrade the current system of vehicle registration stickers that used by Security Department in UTP. The main reason of upgrading new system is to enhance the current system that creating some problem in term of securities in the campus area. The system is specially developed in order to help the management especially the Security Department doing their job effectively regarding to the security system in the main gate. It also will help the management do the quick decision to ensure the safety inside the UTP campus area is protected.

The new system will introduce the technology that will process the data and automatically in tracking the vehicles that enter the UTP's area especially in the main gate. The system will upgrade the current vehicle sticker to the new one that will include the barcode technology. Besides that, the new system will be centralized, which mean the system will have it owns server and by using some programming and tools, it will help the server to execute, that is to store all data in their place and ease the management to process it in future.

1.1.1 Barcode Mechanism

A barcode is a machine-readable (uses dark ink on white substrate to create high and low reflectance which is converted to 1's and 0's) 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

1

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

UNIVERSITI
TEKNOLOGI
PETRONAS

special software. Barcodes are widely used to implement Auto ID Data Capture (AIDC) systems that improve the speed and accuracy of computer data entry.

Practically every item purchased from a grocery store, department store, and mass merchandiser has a barcode on it. This greatly helps in keeping track of the large number of items in a store and also reduces instances of shoplifting. Since the adoption of barcodes, both consumers and retailers have profited from the savings generated.

This system introduce the usage of the this technology which means that it use the barcode reader to read the data from the vehicle sticker and the system will find the related data which is same with the data read from the barcode. The reason of using this technology is the barcode technology is low cost of implementation. It is also easy to setup, easy to use and user friendly, that means the user easily can learn on how to use this technology and the system quickly.

1.2 Problem Statement

1.2.1 Problem Identification

All the student and staff must register their vehicles in order to get into UTP's area. After registration they will be given a sticker with a unique serial number to be attached to their vehicles. The different serial number is used to identify the owner of the vehicle. The Security Department will refer to the serial number in the sticker in order to track the owner of the vehicle and the respective registration number. However, a few problems arise with the current system. In order to recognize the true owner of the vehicle, the security must check the data with the security office. Although each stickers use the different serial number, but the function of the serial number is not utilized in doing the recognition of the vehicles and the owners. The securities only just check whether the vehicles

2

have the sticker or not. If the vehicles have a sticker, they can get into the UTP's area. If not, the securities will check whether they are the student or not and if they are student, they will be compound for not having a vehicles registration.

Based on matters, the current method of the vehicle system is not very practical and not secure for UTP's area nowadays. It is too easy for outsider to get into the campus area and it is too dangerous for the student because of the entire UTP's student live in the hostel inside the campus.

1.2.2 Waste of Time

The current system is time consuming. It takes too long to recognize the owner and the vehicles registration number by checking the data with the office for every vehicle each time they get into the campus area. Imagine that there are more than 30 vehicles wanting to get into the campus area simultaneously, by using the current method, it is difficult to recognize each of vehicles quickly. Based on my finding, it takes 5 minutes for each vehicle to be processed and this problem will result the serial number methods that use nowadays are not practically implemented.

1.2.3 Easy To Duplicate

Beside that, the current vehicle stickers are easy to duplicate. Just create same kind of sticker and put any serial number, anyone can easily come into campus area. This can happen because the security people will only check whether there is sticker attached to the vehicles and not consider whether the sticker is original or fake one. There are 2 types of stickers, motorcycles and four wheel vehicles. Many cases of creating the fake sticker are mostly from motorcycle users and the possibility of the security can detect that stickers are low. That means the low chance to get caught, the higher possibility of creating that type of stickers can occurred.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

UNIVERSITI
TEKNOLOGI
PETRONAS

This sticker is not also doing by outsider but also by the student. By using technology, they just only scan their friend or anyone sticker and just print and laminate it to make the fake vehicle sticker looks likes the real one. Many students doing this method especially the motorcycle owner. So they do not have to register their vehicle but just make a copy from their friend or anyone.

1.2.4 Weaknesses of Current Motorcycle System

This system is created in order to reduce the possibility of the motorcycle from being stolen. The motorcycle owners need to get additional card from the security center. The additional card describes the motorcycle registration card, brand of that motorcycle and the owner of the motorcycle. The card must be shown and be left at the security center each time the user want to leave the campus and collect them anytime they get into the campus area. Although the new system can reduce the possibility of the motorcycle from being stolen, but the new system created is time consuming. Based on the interview, the students especially the motorcyclist felt difficulty each time they want to leave and get into the campus area because they need to bring the additional card each time they want to leave the campus area. For information, the additional card is not attached to the vehicles but need to bring every time the students want to leave the campus area using motorcycle. The system introduce for the student to get their card back is also time consuming. They need to queue and wait each time they want to get the card from the security. Imagine if there are 30 students who want to get their card simultaneously, it will takes more time before they can get their card back.

1.3 Objectives and Scope of Study

1.3.1 Objectives

The main objectives of the project are:

- To implement a system of vehicles recognition using barcode mechanism – the research also will find out what are the challenges if the author wants to use this method for upgrade the current system to the new one.

- To conduct a study on how barcode mechanism will impact on security system – this research will find out what are the significant of converting the usage of serial number to the barcode technology and what are the advantages of doing this method in terms of security especially in UTP campus area.

1.3.2 Scope of Study

The scope of study of this research involves the author to focus on the essential part of the Barcode Technology; the functions that can fulfill the objectives of the projects to integrate it into the security system.

This study also focuses on managing the security department centralized data system. Current system will be studied and there will be some changes and upgrading to be added so the new system can manage data efficiently and meet the requirement needed.

The study involved:

- Area of the implementation – the targeted area for implementing this project is in the main entrance of UTP, inside campus area.

- Barcode Technology – the author need to study on how to upgrade this technology into current system and what are the advantages of using this system in terms of security

- Using specific barcode - what are the symbologies and code that will be used for implementation and what is the type of barcode reader used.

- Platform that will be used – the platform that will be used for implementing this system, and how make this system easy to learn by new user especially the security person.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

UNIVERSITI
TEKNOLOGI
PETRONAS

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The aim of this literature review is to help describe the environment of the new vehicles registration system. In the same time, it serves the purpose to discuss the importance of creating a new system that can improve a current system. Various resources and paperwork is quoted and used in the preparation of this literature review. This literature review supply concise information on improving the current system in many ways such as technological ways and humanities ways. This literature review will cover some of the technologies that are in use today, which can be worked in achieving the required objectives.

2.2 Barcode

"Nowadays, barcode recognition is mainly performed using two basic configurations: active scanning and passive sensing. The active readers include a laser beam, which illuminates the barcode pattern in a mechanical scanning manner. The reflected radiation is sensed by a single detector that feeds an electrical circuit which finally completes the recognition process [1]"

"Bar Code scanners are faster than the human eye and far more accurate. Based on tests, bar code information has an accuracy rate of 1 error per 10,000,000 characters. Compare that to keyboard error rates of 1 error per 100 characters. This form of "automatic identification" can help prevent misidentification errors, which can help save lives and money. Bar coding's eased of use makes it a highly convenient technology. The equipment can be mastered in minutes. The standardization of bar codes and well-developed technology ensures that bar code equipment purchased today will not likely become obsolete in the near future. [2]"

"General purpose barcode scanners are used at checkout counters and hospitals. These are also used to process identification documents. Certain other kinds of scanners, like rugged scanners, are used in harsh or extreme conditions. Of the different barcode scanners, laser scanners and camera scanners are widely used these days. Camera scanners scan and capture the barcode images, which are then processed by sophisticated image techniques to decode the barcode.

Barcode scanners have increased the speed of data retrieval and data processing. They have become a mainstay in commercial establishments, libraries, counters, and virtually at any point-of-sale.

The benefits of barcode scanners are many. It greatly helps you organize your inventory, monitor the movement of goods, and ensure the security of your premises. Bar Code technology is helping enterprises worldwide streamline their business and control costs at the same time. [3]"

The usage of barcode technology are widely use all over the world. It is use for many applications. "Since their invention in the 20th century, barcodes — especially the UPC code — have slowly become an essential part of modern civilization. Their use is widespread, and the technology behind barcodes is constantly improving. Some modern applications of barcodes include:

- Practically every item purchased from a grocery store, department store, and mass merchandiser has a barcode on it. This greatly helps in keeping track of the large number of items in a store and also reduces instances of shoplifting (since shoplifters could no longer easily switch price tags from a lower-cost item to a higher-priced one). Since the adoption of barcodes, both consumers and retailers have benefited from the savings generated.

- Document Management tools often allow for barcode sheets to facilitate the separation and indexing of documents that have been imaged in batch scanning applications.

- The tracking of item movement, including rental cars, airline luggage, nuclear waste, mail and parcels.

- Recently, researchers have placed tiny barcodes on individual bees to track the insects' mating habits.

- In the late 1990s in Tokyo, there was a fad for temporary barcode shaped tattoos among high school girls.

- Many tickets now have barcodes that need validating before allowing the holder to enter sports arenas, cinemas, theatres, fairgrounds, transportation etc.[4]"

"The main benefit of using barcode is Cost Savings. Bar code (automatic identification technology). Allows real-time data to be collected accurately and rapidly. Bar code by itself does not solve problems

Combination of bar code with computer hardware and application software creates potential for improving performance, productivity, and profitability. Reduce Errors, Increase Productivity, Increase Accuracy.

Manual data collection/data entry systems are:

- Slow and error prone
- Barcode: Significantly faster, (about 20 times)
- Barcode: More accurate, (about 20,000 times)
- Manual systems characterized by "Information Float"
- Batch oriented, so databases often out of date
- Barcode data entry can save hours/days of "Information Float" (time between event and entry into information system

- Expensive and error prone means companies discouraged from collecting important information

- Consequences: Significantly higher costs ripple throughout entire organization (even entire industries)

Accuracy

- A well-trained data entry operator makes a data entry error once every 300 keystrokes.

- Leads to waste of time and lost revenues

- Even in worst case, using barcode clearly reduces errors during data collection.[5]"

2.3 Code 128

"Code 128 is a very high-density alpha-numeric symbology with 106 different printed barcode patterns. Each printed barcode can have one of three different meanings depending on which of the three character sets are used. Three different Code 128 start characters are available to tell the scanner which character set is being used. Code 128 is the barcode type used for USS Code 128, UCC-128, ISBT-128, EAN-128, EAN-14, SSCC-18 and SCC-14 specifications.

Although Code128 is a higher density barcode, it requires a checksum to be calculated and can be difficult to use if you are not a technical user. If you are not required to use Code 128 barcodes and you need an easy to use alpha-numeric barcode, consider ID Automation's Code 39 barcode font which does not require checksums to be calculated. If your application is Microsoft Access, Excel, Word, Visual Basic, C++ or an application that supports ActiveX in Windows, it easy to use ActiveX Controls that support Code 128 as well as other barcode types and they automatically calculate the checksum. [6]"

10

2.4 MySQL

"An independent study by Ziff Davis found MySQL to be one of the top performers in a group that included DB2, Oracle, ASE, and SQL Server 2000. MySQL is used by a variety of corporations that demand performance and stability including Yahoo!, Slashdot, Cisco, and Sabre. MySQL can help achieve the highest performance possible with your available hardware, helping to cut costs by increasing time between server upgrades [7]"

CHAPTER 3: METHODOLOGY

3.1 Background

In order to complete this project, there are few critical stages involved. The first stage involves the understanding of the project which includes the literature review on how the barcode systems and the technology, and the problems faced. Besides, some analysis will be conducted to identify and analyze the problem into details. Then only the project will proceed with the designing phase and finally the implementation phase of the project.

3.2 System Development Life Cycle

A very good database design is needed in order to organize a big amount of data. Thus the database design is crucial in providing a good data management in more effective and systematic way. This project will deal with large data transaction and can organize the data itself

In developing the proposed system, the author will use Rapid Application Development (RAD) model approach in the system development life cycle. The author chooses to use this model as documentation will be produced at each phase where it fits with other engineering process model. The stages of the model are illustrated in Figure 3.1:

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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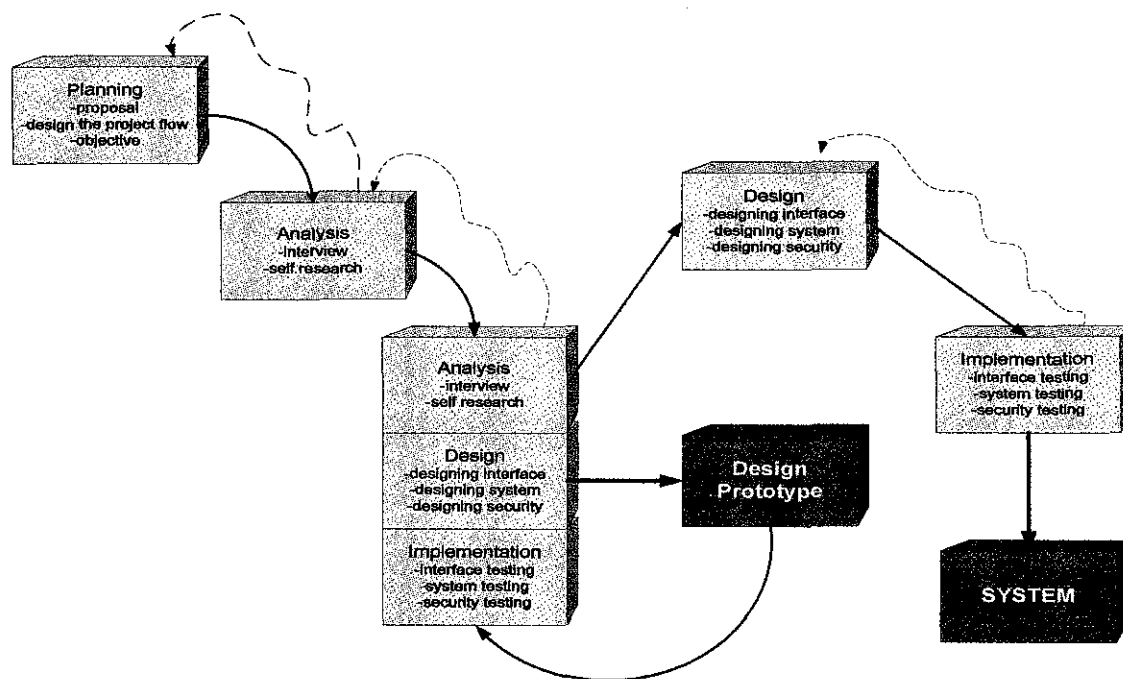
Figure 3.1: Rapid Application Development (RAD)

This system request also assume as complex systems which require careful and detailed analysis and design. Throwaway Prototyping-Based methodologies are particularly well suited to such detailed analysis and design, as opposed to prototyping-based methodologies, which are not. The traditional structured design-based methodologies can handle complex system, but without the ability to get the system or prototypes into the user hand early on, some key issues may be overlooked.

System reliability is usually an important factor in system development. Though this system request is reliability, throwaway prototyping methodologies are the most appropriate when system reliability is high priority, because it combines detailed analysis and design phases with the ability for the project designer many different approaches through design prototypes before completing the design.

This project also design for short time schedules and has schedule visibility, so this type of model is good and suitable for Rapid Application Development based methodologies. This is due to being designed to increase the speed of development.

3.3 How the System Works

Workbench Interface

Vehicles Recognition System
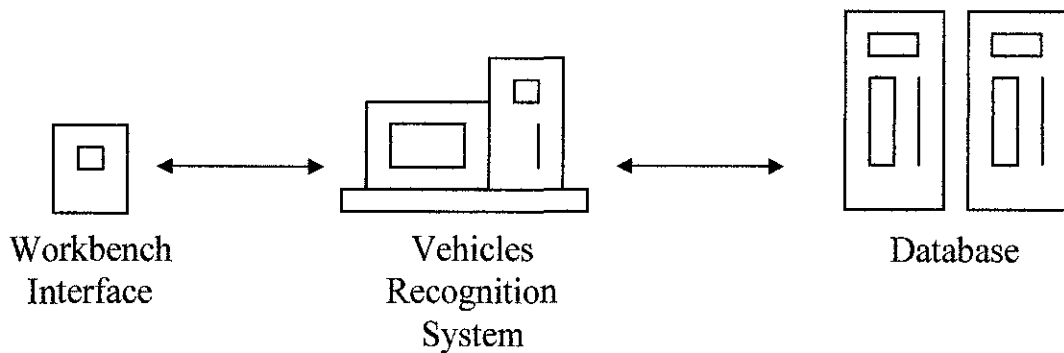
Database

Figure 3.2: Vehicles Recognition System Architecture

As shown in the figure, this proposed system framework consists of workbench interface, uses Local Area Network as medium transaction data, servers for storing databases and Vehicles Recognition System to compile, organize and control the data input and output process. Workbench interface is where all the input information gets done by security during gathering the vehicles information process. All input data are compile and sends to available databases. Then the system will process the data from database then provide the result if requested.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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Workbench interface
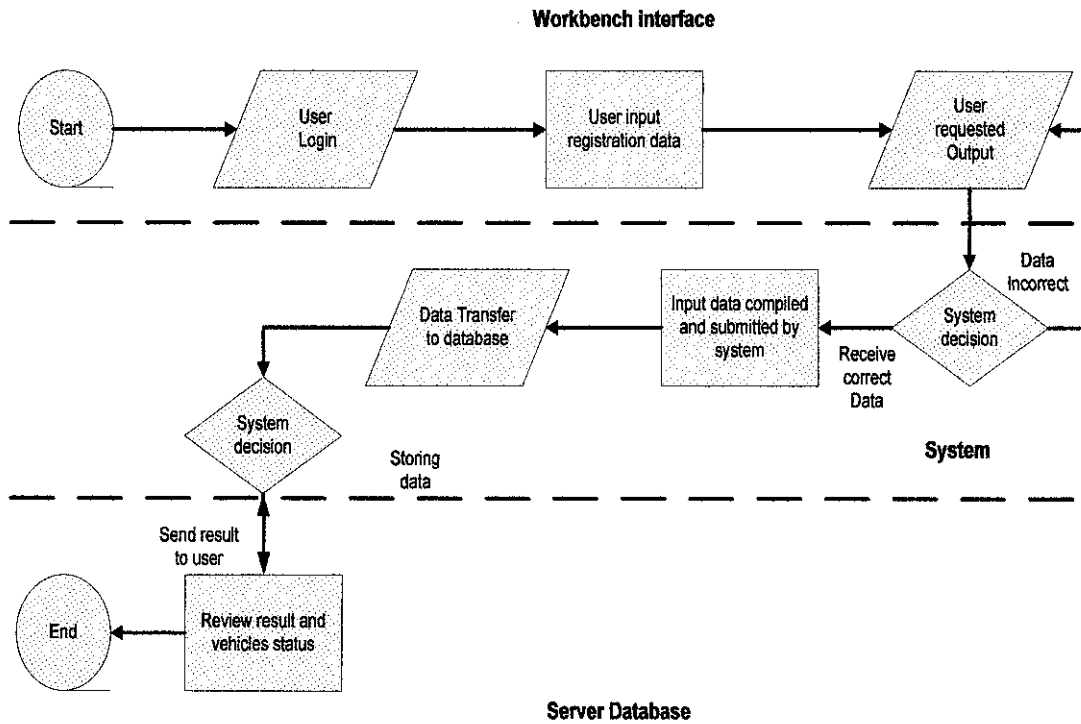
Figure 3.3: New Vehicles System Flowchart

This system will recognize the vehicles stickers using the new vehicles sticker that will replace the old version of serial number sticker to the new bar code sticker.

Each students or staffs who want to enter the UTP's area must have their own vehicle registration stickers. In every vehicle stickers, there is a barcode which symbolize detail of the vehicle data and the owner. The bar code reader will be connected to the client (computer).

Using the barcode scanner, the security just only swaps the scanner to the sticker. Then the scanner will catch barcode in the stickers and convert it into the data and send to the client. The client will send the input to the database for processing the output. After processing, the database will send back the information to the client.

The output will appear at the system which installed in the computer. If the data is correct, the output appear are the owner and the registration number of that vehicle. If the data send is of fake, the program will send error message that tell the user about the data incorrect or not same with the system. If there are some mistakes, the program will display error message and ask for entering back the data. The system also will record the time the vehicles enter and leave the campus area.

Figure 3.4 and Figure 3.5 below shows the Data Flow Diagram and the Use Case Diagram for this system:
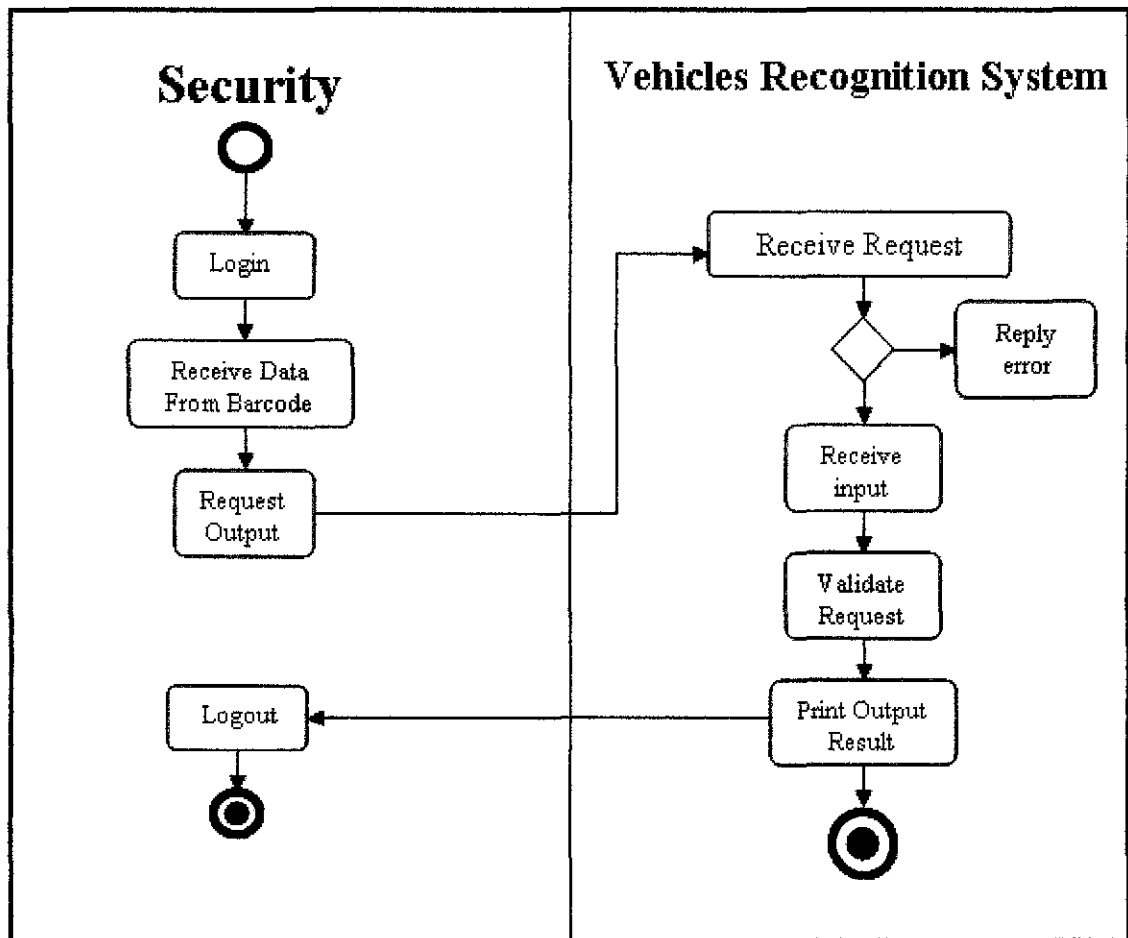

Figure 3.4: Data Flow Diagram
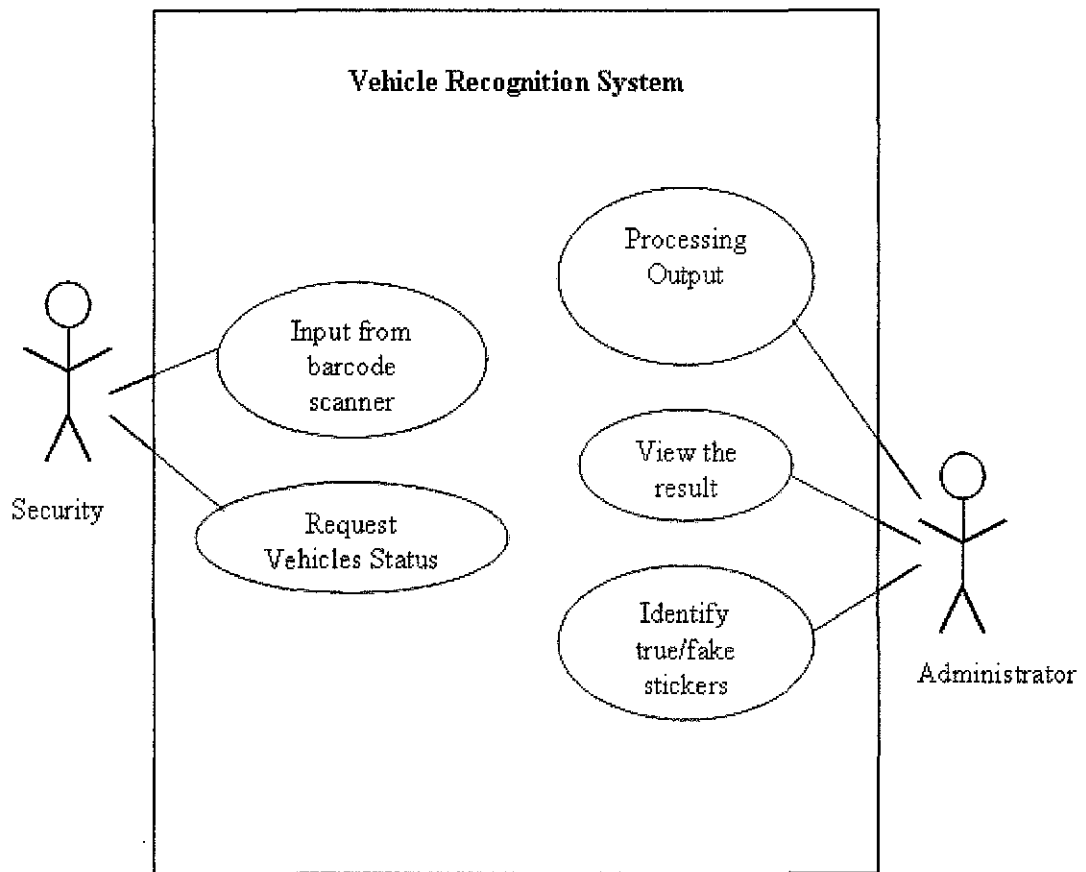
Figure 3.5: Use Case Diagram

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation
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3.4 Method Use

This is the list of methods that will be applied by the author for the development of the vehicles recognition system.

Task	Method
Initial Investigation	*Observations* • Observations on the current system, list of problems, the barcode systems and the technology, and example of the system using barcode method and barcode scanner.
Problem Analysis and Requirement Analysis	*Barcode and Barcode scanner* • The author will conduct a thorough research on how both works and link together. The requirements for both will be analyzed clearly before the system can be developed to prevent any problem occurred during the developing stage.
Project Scheduling	*Gantt Chart* • A Gantt chart will be developed in order to provide a timeline for the work and tasks that have been allocated during the development of the project.
Development / Coding	*Visual Basic and MySQL* • The author will use MySQL for coding and creating database, and the Visual Basic as an interface in the development of the proposed system.

Table 3.1 Method used for Each Task

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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3.5 Hardware & Tools

Below are the hardware specification and tools needed for development of this proposed system:

Hardware Specification	Software Used
- AMD Athlon XP 2800++ GHz - 512MB RAM - 250GB Hard Disk Drive - CD/DVD-ROM Drive - Keyboard - Mouse - Argox AS8110 CCD Barcode Scanner	- Microsoft Visual Studio 2005 - MySQL - Software for Code 128

Table 3.2 Hardware & Tools involved in this project

3.5.1 Barcode Symbologies

Symbologies are systems of encoding data such that a scanner and/or a decoding system may together read and decode the data encoded in the barcode. Aside from the actual technique of encoding the bars and spaces a number of technical specifications or characteristics define and separate one symbology from another.

A Character Set refers to what data a given barcode symbology can encode. Generally, there are three types of character sets: Numeric, Alpha-numeric, and Full ASCII.

- A Numeric character set means the symbology can only encode numeric data from 0 through 9. Some additional characters may be encoded which are generally control features of the symbology, such as start/stop characters.

- An Alpha-Numeric character set means the symbology can encode the digits 0 through 9 as well as alphabetic characters from A through Z. Again, some additional characters may be encoded as start/stop characters.

- A Full ASCII character set is one that allows the encoding of the full ASCII character set. This implies any ASCII character, value 0 through 127, may be encoded by the symbology.

In theory, a numeric character set will produce the smallest barcode whereas a Full ASCII character set will require more physical space to encode the same data. Of course, a Full ASCII symbology gives you more flexibility in encoding more types of information than a numeric symbology.

For this project, the author proposed to use the code 128 to attach to the stickers. Because this project just only converts the serial number into the barcode, so the author decided to use this type of code for barcode. Code 128 is a very high-density barcode symbology, used extensively world wide in shipping and packaging industries. GS1-128 (formerly known as UCC/EAN-128) is one of its variants. It is used for alphanumeric or numeric-only barcodes. It can encode all 128 characters of ASCII and is also capable of encoding two numbers into one character width, called double density. This feature is evidence of it being designed to reduce the amount of space the bar code occupies, to address the ever-increasing needs of item catalogs. Each printed character can have one of three different meanings, depending on which of three different character sets are employed. Code 128 is the major component of the labeling standard for GS1-128 (formerly known as UCC/EAN-128), used as product identification for container and pallet levels of retail markets.

3.5.2 Barcode Scanner

A barcode reader is a hand-held or stationary input device used to capture and read information contained in a barcode. A barcode reader consists of a scanner, a decoder (either built-in or external), and a cable used to connect the reader with a computer. Because a barcode reader merely captures and translates the barcode into numbers and/or letters, the data must be sent to a computer so that a software application can make sense of the data. Barcode scanners can be connected to a computer through a serial port, keyboard port, or an interface device called a wedge. A barcode reader works by directing a beam of light across the barcode and measuring the amount of light that is reflected back. (The dark bars on a barcode reflect less light than the white spaces between them.) The scanner converts the light energy into electrical energy, which is then converted into data by the decoder and forwarded to a computer.

There are five basic kinds of barcode readers: pen wands, slot scanners, Charge-Couple Device (CCD) scanners, image scanners, and laser scanners.

For this project, the author uses the CCD barcode reader. A CCD scanner has a better read-range than the pen wand and is often used in retail sales. Typically, a CCD scanner has a "gun" type interface and has to be held no more than one inch from the bar code. Each time the bar code is scanned, several readings are taken to reduce the possibility of errors. A disadvantage of the CCD scanner is that it cannot read a bar code that is wider than its input face.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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3.5.3 Program based application

Visual Basic (VB) is a programming environment in which a programmer uses a graphical user interface to choose and modify pre-selected sections of code written in the BASIC programming language. It is an event driven programming language and associated development environment for its COM (Component Object Model) programming model. VB derived heavily from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using DAO (Data Access Objects), RDO (Remote Data Objects), or ADO (ActiveX Data Objects), and creation of ActiveX controls and objects.

Visual Basic was designed to be easy to learn and use. The language not only allows programmers to easily create simple GUI applications, but also has the flexibility to develop fairly complex applications as well. Programming in VB is a combination of visually arranging components or controls on a form, specifying attributes and actions of those components, and writing additional lines of code for more functionality. Since default attributes and actions are defined for the components, a simple program can be created without the programmer having to write many lines of code. Performance problems were experienced by earlier versions, but with faster computers and native code compilation this has become less of an issue.

Since Visual Basic is easy to learn and fast to write code with, it's sometimes used to prototype an application that will later be written in a more difficult but efficient language. Visual Basic is also widely used to write working programs. A programmer can put together an application using the components provided with Visual Basic itself. Programs written in Visual Basic can also use the Windows API.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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PETRONAS

3.5.4 MySQL as the Database

According to Shop-Script WebAsyst Glossary, MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database. Because it is open source, anyone can download MySQL and tailor it to their needs in accordance with the general public license. MySQL is noted mainly for its speed, reliability, and flexibility.

MySQL is popular for web applications and acts as the database component of the LAMP, MAMP, and WAMP platforms (Linux/Mac/Windows-Apache-MySQL-PHP/Perl/Python), and for open-source bug tracking tools like Bugzilla. Its popularity as a web application is closely tied to the popularity of PHP, which is often combined with MySQL and nicknamed the *Dynamic Duo*. It is easy to find many references that combine the two in websites and books (*PHP and MySQL for Dummies, PHP and MySQL Bible, Beginning PHP and MySQL,* etc.). PHP and MySQL are essential components for running the popular WordPress blogging platform. Wikipedia runs on MediaWiki software, which also uses PHP and a MySQL database.

MySQL database provides a more lean and flexible alternative. The MySQL code is efficiently optimized for speed. Because the core code having been written and maintained by a single programmer, it is more accurate. MySQL can help achieve the highest performance possible with your available hardware, helping to cut costs by increasing time between server upgrades.

CHAPTER 4: RESULT & DISCUSSION

4.1 Propose System vs. Current System

For the current system use, there is too much problem related to security during the implementation. With just a simple registration and the student will get a sticker that easily can be copied or duplicate by others, student can easily made the copy without needs to register their vehicles to security department. In the new system, with just a few modification and introduce new technology, it give more advantages in order to help the management especially the security management doing their job well to make sure the security in campus are protected. It's also reducing the possibility of duplicate or creating fake stickers. The propose system is also could detect any cheating or plagiarism by check if there are any redundant or more than one data in same time.

Without a centralized database system, this system has faced many problem regarding vehicles data, the vehicle owner data and the status. It is difficult to security department to check all the data in same time because the data are separately with the system used and it is waste of time. Not only that, the system is not really reliable when come to the management office. A centralized database will help them keep all the data stored in one place for easy get it in the future. Besides that, it will help them manage the system effectively.

With the new propose system:

- It introduces the new method of vehicle security system in UTP – the new system will replace the current serial number system with the barcode system that is more efficient. The system will link to the center database to give quick result.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

UNIVERSITI
TEKNOLOGI
PETRONAS

- To recognize the owner and the registration number of the sticker – the new system will process and recognize the vehicles registration number and the owner and will compare it with the database to ensure the data given are correct.

- To recognize the true and fake sticker – the system will detect any duplication or plagiarism of the stickers if the system detect there are more than one data in one time.

- To ensure the system are practically use – because of the current system using serial number are not practically use because of waste of time and slowly get back the output, the new system will ensure the security to use it because the new system are fast and easy to get the result.

4.2 Requirement Needs

While identifying the needs to develop a system prototype that is improved in usability, the author studied the problems on how to link the system with the center database. This was accomplished through literature review and observation on websites and does a study on how to link it.

In identifying the requirements for contents, specification, interface and features for the system, the author does some research for requirements and recommendations. We came up with a certain set of priorities for the vehicle recognition system.

The top priority will be the functionality feature. The barcode scanner and the system are connected together and it can read the barcode in the stickers correctly. The system must be perfect and function in order to easy the security to keep track of all the vehicles. The system also must give a correct result to help the management doing their decision.

The second priority would be the interface of the system. The interface needs to be readable, easy to look, user friendly and easy to manage. The data or output also needs to be depicted and presented well in order to the management catch the data correctly.

The final priority would be the implementation process that is needed by the system to read the input and gather data from the database to send it to the program. The user just has to swap the scanner to the stickers and the system automatically converts the code to the number and then sends to system to process it. The process must be in quick so the efficiency of the system approved.

4.3 Design & Prototyping

At this stage the user interface design concept is developed and the functionality of the prototype is worked out. In the course of developing system, the author created system architecture (Figure 3.1: New Vehicles System Architecture) and a system flowchart (Figure 3.2: New Vehicles System Flowchart) to illustrate the author's idea. The reason why the author created that is to imagine how the flow of the system and to illustrate how each link can join together.

The author has studied on how to system that works and contains usability criteria. The design should include these basic elements to make user quickly get used to the page's contents.

- **The Login Page**

  The objective of login page is to make sure that only the authorize person can use this system. Because of this system build for securities purpose only, so the author put the login page so that only the security who knows the password can use this system.
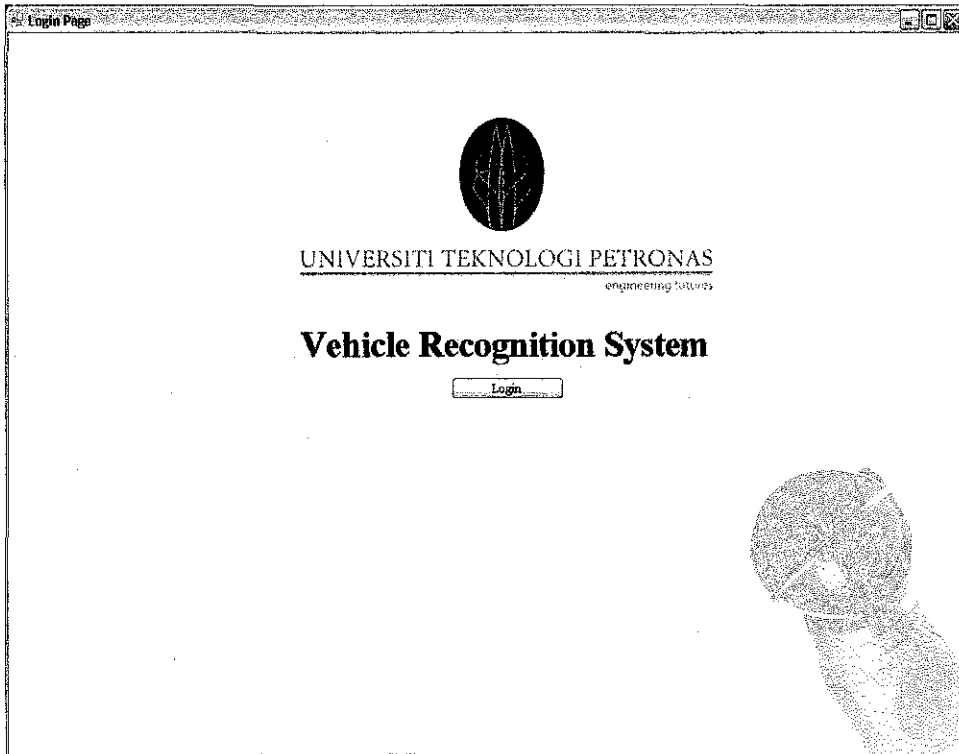
Figure 4.1: Login Page

Figure 4.2: The System Request for Password

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Business Information System
Final Year Project Dissertation

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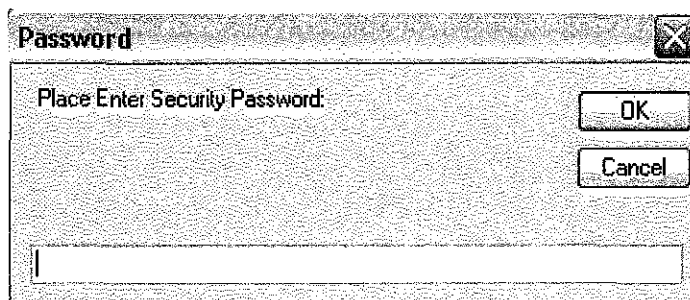PETRONAS

- **Page Titles**

    The button clicked will move them to next page that their click. To easy the user, each of page will have title so they will know where there are now. This function is creating in order to help user especially the new user on how to use it. The title also should be meaningful and understandable.
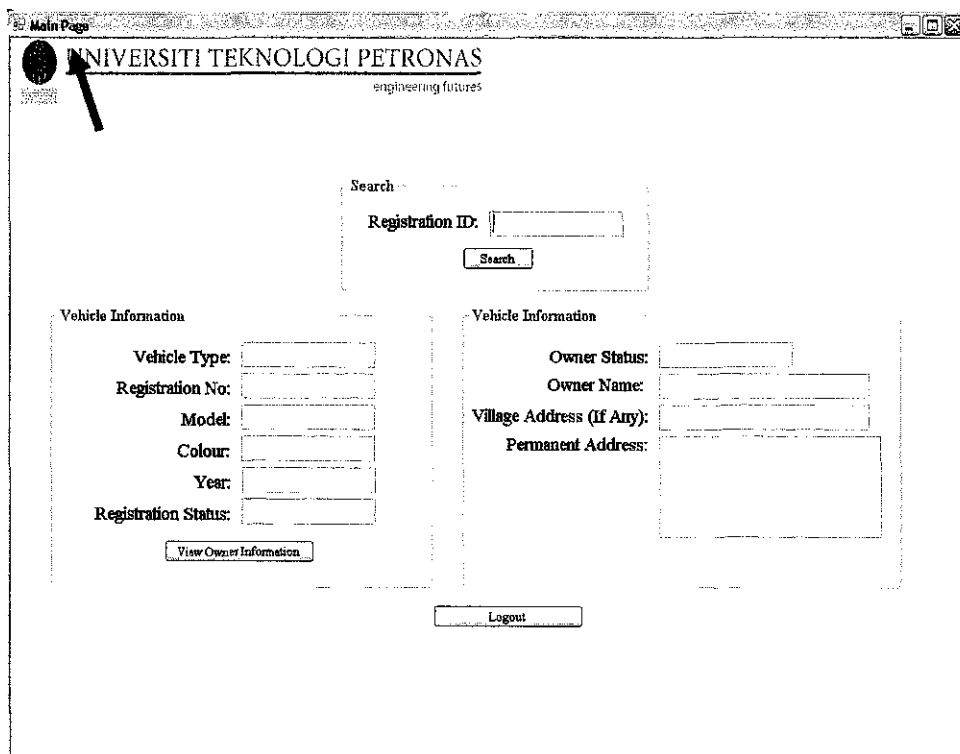

Figure 4.3: Main Page Title

- **The Goals of layout**

i) Simplicity

Keeping the system page structure simple allows the page to support the content. Ensure page titles are recognized as page titles, which navigational elements are clearly for navigation. Also gives the designer control of the information presentation.

ii) Consistency

A consistent layout aids user navigation and make it obvious to users that they are at the same site whether on the main page or the site page. Consistency also increases ease of use and decreases learning time.

iii) Focus

Focus means place emphasis on the key elements of a page. It is the process of ensuring that key elements are the center of attention. Elements of emphasis whether it be a label, title or icon, increasing size of a font or highlighting elements with color. By keeping the pages consistent, focused and minimal, designer retained control over the page and facilitates user navigation and comprehension of the site structure and allows users to quickly grasp the page's content.

Prototype stage is the stage to apply what is known based on analysis of system requirements, review on current related system and study of usability criteria. The prototype is developed page by page; starting from main page, and then proceeded to create others link for example such as vehicle info, owner info, and other link that related to the system.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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The significant of this project after completion are:

- Make the time process done quickly, smooth and systematic – the new system will improve productivity in order to create better organization.

- Ensure the levels of security system in UTP are the best – the effective system will provide better security system and result the campus area more secure.

- Avoid plagiarism and cheating – better system will result better security and with more safety system it will decrease the chance of duplication or creating the fake stickers.

- Information gathering are with fast and easy – using database, the system will process data quick and easy, and decision could make fast and correct.

- Help the management to develop better organization and helping in easier management – the new system will help the organization in managing the security of the campus area more efficient and it will give advantages for organization in making a good decision.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation

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CHAPTER 5: CONCLUSION

As a conclusion, the new Vehicles Recognition System introduce for University Technology PETRONAS's security department will give many benefits to the UTP management especially in terms of creating safety place to live. Compare to the current system, the new system provide more secure recognition system than the older one. It automatically will solve the current problem faced by Security Department and in other words, the work can be more efficient and easy.

A centralized database system will give the management a power of managing data efficient and effectively. Data can be updated and maintained easily and data redundancy could be avoided wisely. Large amount of data can be stored and the load of the data can be faster and accurate.

Hopefully by using the new system, current problems may be settled. The benefit of new system is not only gain by the management, but student also can gain benefit from it especially in term of safety.

Lastly, the new system will help the student to discipline themselves in terms of plagiarism or cheating. With more secure system, the student must follow the rules of regulation of UTP and they do not easily can create or steal anyone stickers without register their vehicles with Security Department. With the entire problem eliminated and the security in campus area more tough, the student could live in safely and peacefully.

Mohamad Shahrul Amri Bin Zainuddin
Business Information System
Final Year Project Dissertation
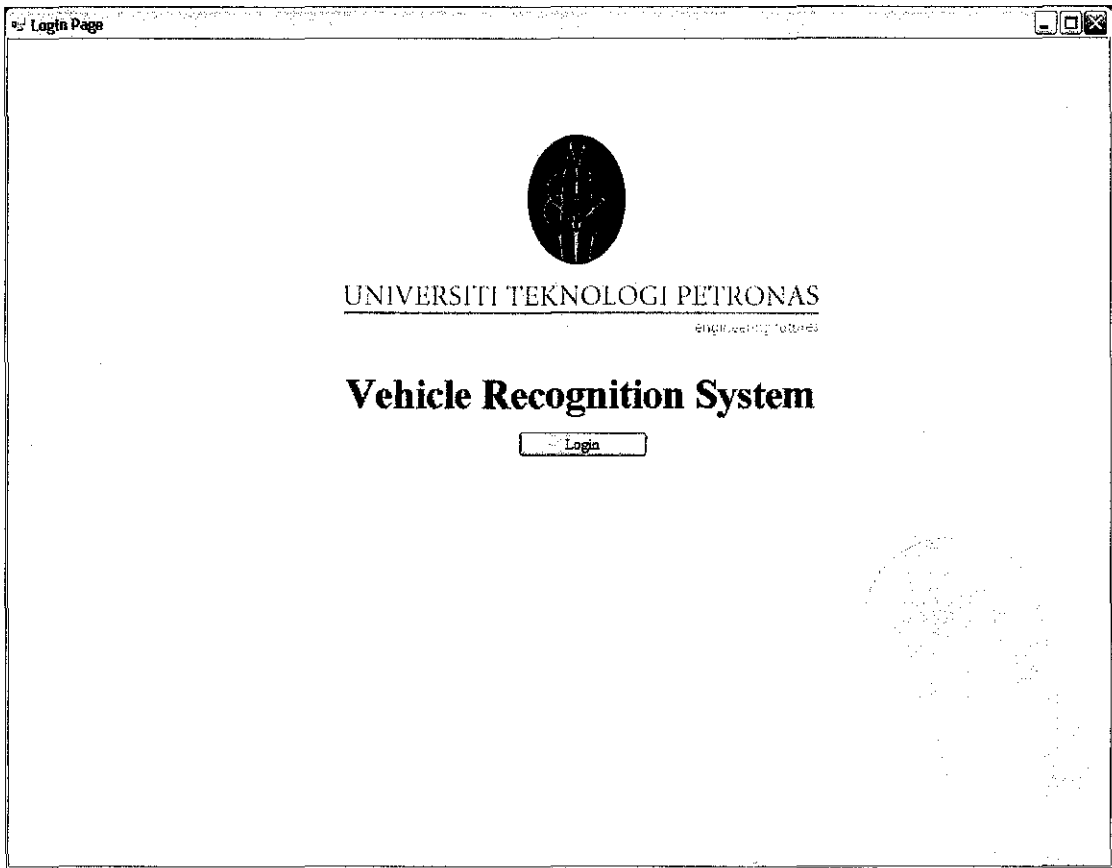
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Appendices

1: The System Interface:

Appendix I: Login Page
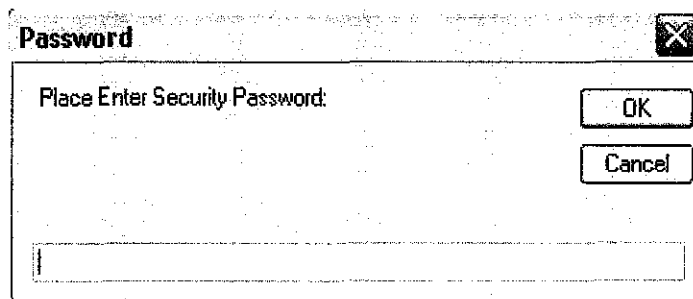
Appendix II: User Enter Password

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engineering futures

Search

Registration ID: [　　　　]

[Search]

Vehicle Information

Vehicle Type: [　　　　]

Registration No: [　　　　]

Model: [　　　　]

Colour: [　　　　]

Year: [　　　　]

Registration Status: [　　　　]

[View Owner Information]

Vehicle Information

Owner Status: [　　　　]

Owner Name: [　　　　]

Village Address (If Any): [　　　　]

Permanent Address: [　　　　]

[Logout]

Appendix III: Main Page

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engineering futures

Search

Registration ID: 10000

Search

Vehicle Information

Vehicle Type:
Registration No:
Model:
Colour:
Year:
Registration Status:

View Owner Information

Vehicle Information

Owner Status:
Owner Name:
Village Address (If Any):
Permanent Address:

Logout

Appendix IV: Data Read From Barcode Scanner

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engineering futures

Search

Registration ID: 10000

Search

Vehicle Information

Vehicle Type: Car

Registration No: WKP8506

Model: Perodua Kancil

Colour: White

Year: 1998

Registration Status: Valid

View Owner Information

Vehicle Information

Owner Status:

Owner Name:

Village Address (If Any):

Permanent Address:

Logout

Appendix V: The System View Vehicle Information

Appendix VI: The System View Owner Information

Appendix VII: Fake Sticker Notification

Appendix VIII: Logout Confirmation

2: The System Code

Code for Login Page

```
Public Class Form1

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button1.Click
        Dim Form2 As New Form2
        Dim Password As String

        Password = InputBox("Place Enter Security Password:",
"Password")
        If UCase(Password) <> "security" Then
            Me.Hide()
            Form2.Show()
        End If
    End Sub
End Class
```

Appendix IX: Coding for Login Page

Code for Main Page (Data Retrieval and Database Section)

```
Public Class Form2

    Private Sub Button3_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button3.Click
        Dim Response As String
        Response = MsgBox("Do You Really Want To Logout?",
MsgBoxStyle.YesNo, "Confirmation")
        If Response = MsgBoxResult.Yes Then
            Me.Close()
            End
        End If
    End Sub

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles btnSearch.Click

Me.ODAVehicle.SelectCommand.Parameters("RegistrationID").Value =
txtID.Text
        Me.DsVehicle.Clear()
        Me.ODAVehicle.Fill(DsVehicle.VehicleInfo)
        txtOS.Text = " "
        txtON.Text = " "
        txtVAdd.Text = " "
        txtPAdd.Text = " "
    End Sub

    Private Sub Button2_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button2.Click
        Me.ODAOwner.SelectCommand.Parameters("RegistrationID").Value
= txtID.Text
        Me.DsOwner11.Clear()
        Me.ODAOwner.Fill(DsOwner11.VehicleInfo)
        txtID.Text = " "
    End Sub


End Class
```

Appendix X: Coding for Main Page

3. Project Schedule For FYP

ID	Task Name	Duration	1	2	3	4	5	6	7	8	9	10	11	12	13	14
							Week No.									
1	Title Selection	2 weeks	■	■												
2	Title Approval	1 week			■											
3	**Problem Identification**															
4	Identify Objectives of the Project	2 weeks			■	■										
5	Identify Needs of the Project	2 weeks			■	■										
6	Establish of Problem Statement	2 weeks			■	■										
7	**Information Gathering**															
8	Overview Current System	2 weeks			■	■										
9	Hardware and Software Requirement	2 weeks			■	■										
10	System Usability	2 weeks			■	■										
11	Preliminary Report	2 weeks			■	■										
12	**Information Analysis**															
13	User Requirement	3 weeks					■	■	■							
14	Resource of Content	3 weeks					■	■	■							
15	**Interface Design**															
16	Flow Chart	3 weeks					■	■	■							
17	System Architecture	3 weeks					■	■	■							

#	Task	Duration																
18	Progress Report	1 week									■							
19	**Prototype Development**																	
20	Main Page	5 weeks										■	■					
21	Site Page and Links	5 weeks												■	■			
22	Phased 1 Testing	1 week														■		
23	**Final Reporting**																	
24	Interim Report	1 week															■	
25	Oral Presentation – Final Reporting	1 week																■

Appendix XI: Gantt Chart For Project Schedule FYP I

ID	Task Name	Duration	Week No.													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**Further Enhancement of System**															
2	User Interface	2 weeks	■													
3	Site Page and Links	2 weeks		■												
4	Progress Report 1				■											
4	Creating System Database	3 weeks				■	■	■								
5	Database Linking	2 weeks						■								
6	Phased 2 Testing	1 week						■								
7	Re-evaluate and redevelop system if necessary	1 week							■							
8	Phased 3 Testing	1 week								■						
9	Seminar – Progress Reporting	1 day									■					
10	Exhibition/PreEdx	1 day										■				
11	**Final Reporting**															
12	Final Report	1 week										■				
13	Oral Presentation – Final Reporting	1 week													■	
14	Submit Dissertation	1 week														■

Appendix XII: Gantt Chart For Project Schedule FYP II