PLATE NUMBER RECOGNITION SYSTEM (PNRS)

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BORANG PENGESAHAN STATUS TESIS*

JUDUL: PLATE NUMBER RECOGNITION SYSTEM (PNRS)

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(PNRS)

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This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Artificial Intelligent).

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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DEDICATION

To my parents, for their support and motivation throughout my PSM ... ...

To my supervisor, Dr Burairah Hussin, for making it all worthwhile ...

I also want to thanks to my all my friends that always are by my side as I working on this project ... ...
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ABSTRACT

This project name is Plate Number Recognition System (PNRS). The software that used in developing this system is MATLAB R2009a. The main objective of this project is to teach the computer to recognize the character in an image. There are several image processing techniques being used in developing this system. This system development consist of Image Pre-Processing Phase, Feature Abstraction Phase, Character Recognition Phase and Data Collection Phase. This system also can be implemented at security post guard. These system digitalize manual system to identify car bypassing premises by kept record of each vehicle. This system can decrease human mistake by replace the read the plate number automatically and kept the output in computer file directory.
ABSTRAK

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CHAPTER 1

INTRODUCTION

1.0 Project Background

The project to be developed is “Plate Number Recognition System”. This system use to redeem the task of manually typing the plate number of the bypassing vehicle into the computer system. It is believed that there are currently more than half a billion cars on the roads worldwide. All those vehicles have their vehicle identification number as their primary identifier. The vehicle identification number is actually a license number which states a legal license to participate in the public traffic. All vehicles worldwide should have its license number - written on a license plate which mounted onto its and no vehicle without properly mounted, well visible and well readable license plate should run on the roads.

To process, sort or analyze data everyone thinks about using computers. If the data is already in the computer most of these tasks are rather easy to be carried out. It is needless to say that the license number is the most important identification data a computer system should treat when dealing with vehicles.
Suppose a company's security manager would like to have a system that precisely tells at every moment where the cars of the company are in the premises or out on roads. By registering every single drive-out from and drive-in to the premises, the system could always tell which car is out and which is in.

The key issue of this task is that the registration of the movement of the vehicles should be done half automatic by the system which in reading/record the plate number. As a human, we tend to make mistake and this system would help to reduce the mistake by automatically read the plate number.

Plate Number Recognition System identification system solves this problem and it recognizes the license plate numbers from images. This system uses the images, which are taken from a camera, and manually crop the plate number region. After that, Pre-process techniques will be implemented to get the better image of the plate number and the system recognizes them, they are stored as text. In this way, these tasks become half automatic and less manpower is required for them. Moreover, the probability of human mistakes disappears with this system.

This Plate Number Recognition System may also be applied for these following places:

- To check/keep record vehicle in and out of the premises.
- To assist visitor management system in recognizing guest vehicles.
- Use in border crossings. To keep every records of vehicle in and out from the country.
- Use in parking management system to check the available car park available.
- “Drive-Through Customer Recognition”, to automatically recognize customers based on their license plate and offer them their last session.
1.1 Problem Statement

Analyze the identified problems is a collection of information about all the existing and non-exist automation around Malaysia. During the information stage, the main problem statements for current system are listed as follows:

In current security system, security guards still use manual system to keep the record of bypassing vehicle in and out from the premises. Security guards tend to make mistake when identify the plate number.

The current system is not completely systematic. The records of the plate number will be kept in Log Book. As we all know, this manual file management system are not easy to maintain. The Log might book may be stolen or misplace.

Furthermore, the person who in charge to keep every records of vehicle in and out might be tired and not do their job and just let the vehicle to pass trough in or out from the premises. By using PNRS all problem stated above can be solve easily by digitalize the system itself.
1.2 Objectives

The main objectives of the proposed project are listed as following:

(i) To explore plate recognition techniques worldwide.
(ii) To use appropriate technique for Malaysian plate number recognition.
(iii) To digitalize the manual recognition process for further usage.

1.3 Scopes

The scope of this project will be the current manual security system in UTeM post guard. The project has five different implementation steps:

(i) **Image Pre-processing**

   In image pre-processing, the function of this step is obtaining the required information from the digital image by using image-processing methods.

(ii) **Feature abstraction**

   The image of plate number will undergo object labeling and each character will be label.

(iii) **Character Recognition**

   The character recognition part is when the image that already undergoes pre-process and feature abstraction will undergo recognition process. The plate number that already been segment will be recognized using our letter and numbers library.

(iv) **Data Collection**

   The result which is the plate number will be kept into a local folder as a text file.
(v) **Graphical User Interface**

A simple and efficient graphical user interface is develop in order to facilitate the plate number recognition system. The current design of the GUI is more to show about the detail flow of the system. The GUI can be reconstructing to facilitate the user.

There are several assumptions being made in this system:
- The plate number must be Malaysian Standard Plate number.
- The plate number only has one line.
- The plate number character (font) must be a Malaysian standard plate number.
- The image taken must be in-front of the plate number with distance 10m from the vehicle.
- We assume that the plate number located at the same position in the image.

### 1.4 Project Significance

Plate Number Recognition System definitely brings benefits to user in many sectors like in security department where they can check/keep record of vehicle in and out of the premises. In service management sector, where this system can assist them to recognize their customer by identified the plate number. This system also can be useful for government sector especially for border crossing, this system will save every plate number that cross the border. PNRS benefits for parking management, where they can calculate how many parking available according to their database.

Basically, the significance of the proposed project is to build an computerize system that replace the manual system by designing an interface and developed the function for recognizing the plate number automatically without using human capabilities of reading. This system also wants to replace the file management system (Log Book) to computerize file system. These changes will make the system more efficient than manual system.
1.5 Expected Output

To develop a system that can recognize the car plate number automatically which comprise of following function:

(i) To load image that contain plate number.
(ii) To enable the crop function that use to crop the plate number automatically.
(iii) To change the image to black and white image.
(iv) To change the black and white picture to negative picture. Where white pixel change to black pixels and otherwise.
(v) To recognize the plate number by recognize one by one of the character and will display the result in the text box.
(vi) To save result in computer file directory.

1.6 Conclusion

Plate Number Recognition System will use Image processing techniques and also mathematics formula which is correlation function. These systems have 4 basic phases which are image pre-processing, feature abstractions, recognition and data collection. All this phases will contribute to the success of this system.

Once the scopes and objectives are identified, this will bring to the next activity which is the literature review and project methodology that will be discussed in detail in the next chapter.
CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter tells about the manner the software engineering process is carried out from preliminary study and literature review until the project planning stage. Basically this chapter includes facts and findings, project methodology, project requirements, project schedule/milestone and conclusion of this chapter. The objective of this chapter is to gather all the information needed and to ensure that nothing is overlooked and that every system problems and objectives is identified.

This chapter also is most crucial part in system development because in this chapter will give us opportunity to discover more about subject that relevant to the project and see how the others have approached the proposed area. The research is about recognition of a character in a plate number and image processing techniques and pattern recognition techniques are completed and done through searching, studying and analyzing relevant source from reference books,
journals and web pages. Furthermore, supervision from supervisor with fully guidance and advice are helping to complete the research.

2.2 Facts and Findings

**Malaysian vehicle license plates** are license plates displayed on all motorized road vehicles in Malaysia, as required by law. The issuing of license numbers is regulated and administered by the Malaysian Road Transport Department, but the Department is not largely in charge of the production of license plates. Instead, vehicle dealers and specialized businesses produce the vast majority of license plates in the country. The computerize approach when recorded data about vehicle in and out from the premises is important. Plate Number Recognition System helped to decrease the probability of human mistakes while reading the plate number and recorded it in database/log book.

2.2.1 Malaysian Vehicle Plates Study

![Malaysian Vehicle Plates](image)

Figure 2.0: Malaysian Vehicle Plates

This is the standard layout configurations of plates for Malaysian private vehicles. The most common form of Malaysian Plate Number is derived from early iteration of plate design in United Kingdom. Malaysian Plate Number must contain minimum one character upper case alphabet and maximum three character followed by number that will start from number 1 until 9999. Example: ABC 1234.
The format is used in all classes of vehicles with engines unless stated later:

- Private vehicles (cars, motorcycles, vans, trucks and other vehicles of similar design).
- Commercial and industrial vehicles (vans, trucks – light or heavy, buses, road-legal vehicles for construction and excavation and other vehicles of similar design)
- Service vehicles (police cars, ambulances, fire engine, public transport and other of similar design).

The Malaysian plate number on cars are normally used Arial Bold as typeface of letterings, but other readable fonts are also used occasionally. While the rear number plates of motorcycles are required to be displayed in standard fashion, there are fewer restriction on number plates displayed at the front, allowing them to be placed on the front mudguard or fairing of the vehicles, with or without a black license plate.