



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF VEHICLE PLATE NUMBER AND
IDENTITY CARD RECOGNITION FOR GUARD HOUSE
USING OPENCV**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

by

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Tajuk: DEVELOPMENT OF VEHICLE PLATE NUMBER AND IDENTITY CARD
RECOGNITION FOR GUARD HOUSE USING OPENCV

Sesi Pengajian: 2019

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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Nama bagi projek ini adalah Pengenalpastian Nombor Plat Kenderaan dan Kad Pengenalan untuk pondok pengawal menggunakan OpenCV. Projek ini menggunakan OpenCV sebagai fungsi utama dalam pengaturcaraan komputer untuk mengenali watak dan nombor pada nombor plat kenderaan. Dengan menggunakan kamera, imej nombor plat dapat diambil dan menggunakan teknik pemrosesan imej, kualiti imej nombor plat kenderaan dapat ditingkatkan dan pengenalpastian nombor plat dapat dilakukan sebelum disimpan dalam sistem. Sistem ini akan dilaksanakan di pondok pengawal bagi kawasan kediaman. Dengan hanya mengimbas nombor plat, sistem ini dapat mengenal pasti jika kenderaan tersebut adalah penduduk kawasan kediaman tersebut dan penghadang keselamatan akan dinaikkan secara automatik sekiranya berdaftar. Sekiranya tidak pemandu kenderaan tersebut perlu mengimbas kad pengenalan mereka dan mendaftar sebagai pelawat atau penduduk baru seterusnya penghadang keselamatan akan dibuka. Dengan melaksanakan sistem ini, kesilapan yang dilakukan oleh pengawal dapat dikurangkan dengan menggantikan sistem yang sedia ada dengan automatik. Masa pengawal keselamatan dapat dijimatkan bagi memastikan keselamatan kawasan kediaman terjamin.

ABSTRACT

The name of this project is Development of Vehicle Plate Number Recognition and Identity Card for Guard House using OpenCV. This project uses OpenCV as its main library of programming function to recognize the character and number at the plate number of a vehicle. By using a camera, the image of the plate number can be obtained and several image processing technique will be used in order to enhance and define the number before it can be stored in the software that act as the database of the program. this system will be implemented in guard house at residential area. By scanning the plate number, the system will identify whether the vehicle is the resident of the area and the gate will be automatically opened if its registered. If not, the driver needs to scan their identity card at the guard house as visitor or new residence in order to allow the vehicle to pass the gate. By implementing this system, it can decrease human mistake by replace the detecting of the plate number to automated and can save time for the security guard in keeping the residential area safe.

DEDICATION

To my beloved parents,
Bernard Toidin and Jeanny Ah Jin.

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CHAPTER 1

INTRODUCTION

1.1 Background

The project to be developed is “Vehicle Plate Number and Identity card Recognition for Guard House using OpenCV”. This system use OpenCV library and Python language as its main function in order to obtain the character in the plate number of a vehicle and transfer the data to the system in the computer ad detect whether the vehicle are registered as the local resident to the residential area or not. It is believed that there are more than billions number of cars in the world and to keep track on it are almost impossible. Even for residential area, taking care of the vehicle in and out at the residential area in order to keep the safety of the residential area is a difficult task for security guard.

By implementing this this system, their burden can be lessened as it will scan every vehicle that enter the residential area and will allow only registered vehicle to pass the gate. Unregistered vehicle will be allowed to enter after the driver scan their identity card at another scanner and store both the vehicle plate number and the driver data to the system created for this project.

Plate number recognition was already created back in 1976 at the United Kingdom. It was known as Automatic Number-Plate Recognition (ANPR) which is a technology that uses optical character recognition on images to read vehicle registration plates to create vehicle location data.

Several types of projects that quite similar like this was already being invented and improvised but the implementation in Malaysia was so few and usually it is expensive to be implemented in some area. Thus, this project will be helpful in many places especially in residential area and can reduce human mistake in tracking each vehicle entering the area.

This vehicle plate number and identity card recognition also can be applied in these following areas:

- Use in border crossing. To keep every record of vehicle that in and out from the country.
- Use in parking management. To check reserved parking space whether registered vehicle park in designated parking box.

1.2 Problem Statement

In Malaysia, the current security system used in most places such as hotels, residential area, government places and other places that needed guard still using manual system to keep the record of bypassing vehicle in and out from the premises which the security guard themselves need to record the vehicle plate number by themselves either from the camera or going in front of the vehicle and this will cause several mistake done by the guard when identify the plate number.

In some cases, some of them still using logbook to record the plate number and it is known that manual file management system is not easy to maintain. They need to search every page of the logbook to find whether the vehicle is registered or not. Besides, the logbook might be stolen or misplaced.

Furthermore, to maintain this manual system management require a lot of energy in order for the system management to be updated always. Person in charge are needed in every shift to maintain the logbook. As a result, the guard might get tired of handling this manual system management and at one point will just let the vehicles pass without and security clearance.

At UTeM Technology campus, the security guard or known as “Polis Bantuan” is still using manual system which is they will need to go out from the guard house to check every vehicle that enter the campus. Although UTeM car’s sticker are provided and data are recorded to the system, they still need to stand under the hot sun to check every vehicle to ensure only registered vehicle can be allowed to enter the campus.



Figure 1.1: UTeM Guard House

Figure 1.1 above shows the condition of the guard house at the entrance of UTeM Technology Campus. Every weekdays morning the guard on duty will stand outside of the guard house to check every vehicle that entering the campus. At the afternoon they also need to step out from the guard house whenever there is a vehicle entering the campus

and any visitors will have to stop and step out from their car to register their name and vehicle at the guard house. This manual system clearly troublesome both for the security guard and the visitors themselves.

1.3 Objective

The main objectives of this project are listed as following:

1. To implement image processing for Malaysia vehicle plate number.
2. To implement image processing for Malaysia identity card.
3. To implement fully automated technology in plate number recognition at UTeM.

1.4 Scope

The scope of this project is focus on:

1. Local vehicle plate number with black background and white character and number.
2. Malaysia identity card with blue colour of background.
3. Project will be tested in both indoor and outdoor condition with indoor and outdoor temperature and lighting.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is the documentation of a detailed review of the published and unpublished work that related to this research. The reviews of previous research project that related to this project will become an additional information source in order to complete this project successfully. A brief understanding about license plate number, Raspberry Pi, and other component related to this project will be discussed in this literature review.

2.2 Vehicle Registration Plates of Malaysia

In Malaysia, vehicle registration plate number are displayed at the front and rear of all types of car whether private vehicle or commercial vehicle as acquired by law. A plate number is a small metal or plastic which contain alphabets and number to show the vehicle's identification same as citizen identification card. There are 3 form of vehicle registration number specification that have been issued by Road Transport Department Malaysia (JPJ):

1. White letters and numbers are affixed or bounced over a black frame.
2. White letters and numbers are affixed or embossed over red frames for embassy vehicles, United Nations and the international Natural Rubber Association.
3. Black letters and numbers are bounced over white frame for taxi or rental car.

Malaysian plate number design is in the form of single row or two rows which has been standardized by JPJ as shown in Figure 2.1. Any customized number plate in Figure 2.2 is illegal in Malaysia as it has been a thorn in the side of law enforcement agencies in the country for a long time (Lee, 2016). The design of Malaysian plate number is different from other countries such as the United States of America which has the state's name on it to identify the vehicle origin and India as shown in Figure 2.3 and Figure 2.4.

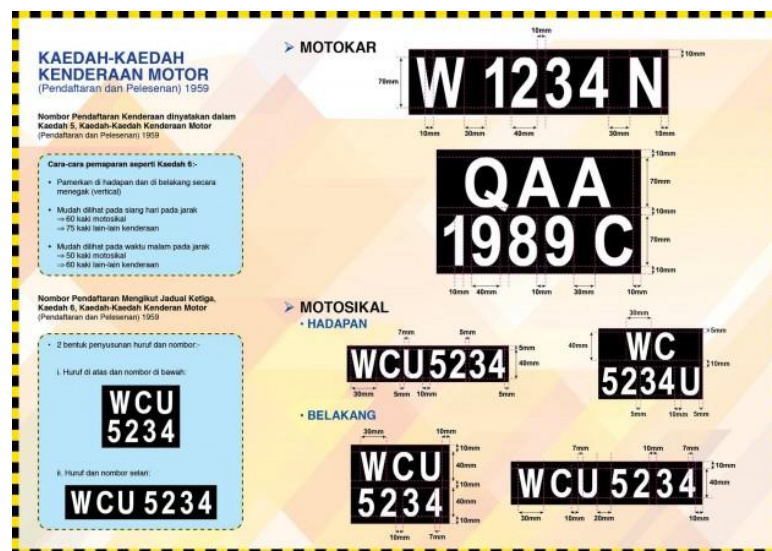


Figure 2.1: Standardised Malaysia Plate Number



Figure 2.2: Customized Plate Number



Figure 2.3: USA Plate Number



Figure 2.4: India Plate Number

Our vehicle plate number was introduced during British colonial days which use Arial Bold typeface (Leesan, 2019). Over the years, the design of the plate number has been improved to ensure it is durable and easy to read. The first alphabets of each plate number are referred to the state in Malaysia such as letter “J” is referred to Johor and letter “Q” is referred to Sarawak. This make the plate number easier to be recognize by everyone.