

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: **LICENSE PLATE IMAGE RECOGNITION FOR PARKING SYSTEM
USING MOBILE APPLICATION**

Sesi Pengajian: 2019

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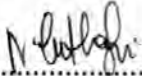
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APPROVAL

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ABSTRAK

Antara cabaran yang dihadapi oleh pengguna dalam kehidupan seharian, salah satu cabaran yang paling tidak dapat dielakkan adalah mencari tempat letak kereta. Apabila keperluan pengguna meningkat, perjalanan mereka turut meningkat. Ini menyumbang kepada peningkatan dalam penggunaan kenderaan dan peningkatan populasi di mana proses mencari tempat letak kereta telah menjadi kerisauan pengguna terutama pada waktu yang sibuk. Semasa waktu yang sibuk, kebanyakan tempat letak kereta telah ditempah dan ini mengundang pengguna terpaksa mencari tempat letak kereta lain yang menyebabkan gangguan lalu lintas dan membuat pengguna tanpa petunjuk mengenai ruang letak kereta yang kosong. Apabila pengguna melawat pelbagai tempat awam seperti pusat membeli-belah, pawagam dan hotel multiplex semasa waktu perayaan atau hujung minggu, ia menyebabkan masalah mencari tempat letak kereta. Menurut satu kajian yang dijalankan oleh Boston Consulting Group (BCG), iaitu "Unlocking Cities", penduduk Kuala Lumpur menghabiskan purata sekurang-kurangnya 25 limit setiap hari untuk mencari tempat letak kereta yang berjumlah hingga 6.3 hari berturut. Kajian membawa kepada 30 hingga 40 peratus kesesakan lintas. Bagi mengatasi masalah ini pasti keperluan untuk tempat letak kereta yang terancang. Untuk merancang slot kereta tersebut, tempahan slot tempat letak kereta perlu diambil kira dengan ruang tempat letak kereta yang optimum yang bergantung kepada kos dan masa. Oleh itu, kajian ini mencadangkan aplikasi Android yang digunakan untuk melaksanakan prototaip "License Plate Image Recognition for Parking System Using Mobile Application" yang membolehkan pemandu mencari ruang letak kosong dengan berkesan dengan bantuan "Internet of Things". Projek ini direka untuk mengurangkan kesulitan pengguna mencari tempat letak kereta dan ia melibatkan Teknik pemrosesan imej untuk nombor plat kereta.

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ABSTRACT

Among the challenges that users face in day to day life, one of the most unavoidable challenge is finding car parking. As users' daily needs increase, their travelling increase. This made the drastic increase in usage of vehicles and increase in population where finding a car park slot has been a major concern particularly during busiest hours of the day. During peak hours most of the reserved parking area gets full and this leaves the user to search for their parking among other parking area which creates more traffic and leaves them with no indication on availability of parking space. When users visit the various public places like shopping malls, multiplex cinema hall & hotels during the festival time or weekends it creates more parking problem. According to a study conducted by the Boston Consulting Group (BCG) called, "Unlocking Cities", Kuala Lumpur folks spend an average of at least 25 minutes daily in search of parking which totals up to 6.3 consecutive days. This searching leads to 30 to 40% of traffic congestion. In order to overcome this problem, there is definitely a need for designed parking in commercial environment. To design such parking slot, account of reservation should be taken of parking slot with optimal parking space which depends on cost and time. This paper proposes an android application, which is used to implement a prototype of License Plate Image Recognition for Parking System Using Mobile Application that allows drivers to effectively find and reserve the vacant parking spaces with the help of IoT (Internet of Things). This project is designed to reduce the hassles in finding parking and it involves the method of image processing techniques for license plate number.

DEDICATION

To my beloved mother and father

ACKNOWLEDGMENT

I would like to articulate my gratitude and indebtedness to my project guide Mr. Zulhairi bin Othman who has always been a constant motivator and guiding factor throughout the project time in and out as well. It has been a great pleasure for me to get opportunity to work under and complete the project successfully.

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LIST OF ABBREVIATIONS

FYP	-	Final Year Project
GUI	-	Graphical User Interface
JPEG	-	Joint Photographic Expert Group
PC	-	Personal Computer
FTKKEE	-	Fakulti Teknologi Kejuruteraan Elektrik Dan Electronic
LED	-	Light Emitting Diode
IR	-	Infrared Radiation
RGB	-	Red Green Blue
RFID	-	Radio-Frequency Identification
GSM	-	Global System for Mobile Communication
IDE	-	Integrated Development Environment
USB	-	Universal Serial Bus
OCR	-	Optical Character Recognition
TFF	-	Tagged File Format
bmp	-	Bitmaps
ANPR	-	Automatic Number Plate Recognition
ALPR	-	Automatic License Plate Recognition
AVI	-	Automatic Vehicle Identification
UK	-	United Kingdom
LCD	-	Liquid Crystal Display
AVM	-	Around View Monitor

QR	-	Quick Response
SPSR	-	Smart Parking System Based on Reservation
SMS	-	Short Message Service
OPS	-	Online Parking System
IoT	-	Internet of Things
ROI	-	Region of Interest

CHAPTER 1

INTRODUCTION

1.1 Motivation

The elementary inspiration of this project is to diminish the traffic congestion that occurs in and around the urban zones which is caused by vehicles looking for parking. Many articles are seen in the newspapers regarding the parking problem in all over Malaysia like Kuala Lumpur, Penang, Johor Bahru and many metropolitan cities. During rush hours most of the reserved parking area gets occupied and this makes the user to find for their parking among other parking area which creates more traffic and leaves them with no sign on availability of parking space. Smart city is an innovation that focus to coordinate various information and communication solutions to local with crucial services like smart parking inside the all streets. Nowadays, the parking system has been improved with new advance technology that allowing urban groups to reduce the congestion level altogether. Internet of Things (IoT) is also new progression which helps in identification of vehicle availability by primary data and computational ability to make an intelligent parking system. The main motive of using IoT for parking is to gather the data easily for available parking slots. This work presents the basic model of IoT-based Real Time smart Parking System with attainable data to make it easier for users to locate a free parking slot at the shopping malls or hotels.

1.2 Project Background

This system develops the car park as an IoT network, and the information that contain the number of spaces in car park areas will be exchanged to the data center.

The data center performs as a cloud service to display the parking lots and frequently updates and are accessible any time by the user in the network by using mobile application. This research additionally implements a system prototype based on Arduino with License Plate Recognition method using a smartphone that provides the communication and user interface for both the control system and the cars' number plate to confirm the feasibility of the proposed system. The user will register car number plate using Android application which will be in saved in Cloud for reservation purpose. Upon reaching the parking entrance, the number plate of the car will be captured by the camera. This system able to automatically remove and perceive a car plate number's characters from the captured image. It includes a camera to grab an image, to find the location of the number in the image and then remove the characters for characters recognition tool to translate it into attainable data format. This system will make comparison with the existing data stored in the image database which managed by the admin. The user is unable to access into the parking lot if the number plate does not match.

1.3 Problem Statement

Currently, the common strategy of finding a parking spot is manual where the driver generally searches a space in the street through luck and experience. User having difficulty to find parking during peak hours where most of the reserved parking area gets full. When users visit the various public places like shopping malls and hotels during the festive season or weekends it creates more parking problem. This process requires extra time and effort when the user fails to find parking space in a city with high vehicle density.

1.4 Objectives

The objectives of this research are as follows:

1. To study and develop the relation between LabVIEW and license plate recognition using camera.
2. To design and integrate a smart monitoring parking system hardware and software with LabVIEW and Android application.
3. To analyze the efficiency of license plate image recognition with the image database.

1.5 Scope

This system is build based on the Arduino and Android application. Scope of this project will be divided into four modules which integrates between microcontroller, sensor, hardware and the software. Microcontroller will be the central processing unit where it integrates between the IR sensor, servo motor and the image database at the same time send information to users. Hardware compromises of Infrared sensor to indicate the car entry and exit and USB WebCam camera where it acts as machine vision to recognize the character on the license plate of car and send to LabVIEW database for interpretation of matching license plate. Microcontroller scope is limited to check presence and lifting up and down the barricade. Image recognition scope is to recheck that the exact car that have made the booking have accessed the parking. If else, fine or clamp will be issued for unauthorized vehicle. The main scope of this project is to develop a monitoring parking system using image recognition technique to accomplish car user needs that can control and monitor the

car at parking spaces specifically in shopping center building and hotel. This system focuses in the building which has limited parking spaces.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter presents literature review of the development of License Plate Image Recognition for Parking System Using Mobile Application. The main idea behind this project is to enable the client to book a parking slot in advance and display number of free slots in that particular area. This chapter additionally covers the theoretical background and concepts of this project in relation with the parking system type, image recognition method, and communication through mobile application. Besides that, the advantages and disadvantages of this project will be shown too.

2.2 Related Researches

The study of previous researches related directly or indirectly have been discussed and reviewed based on K – Chart as shown in figure 2.1. K – Chart is a method to show the understanding and flow of the project related to establish a new method to complete this project. This chart is a basic knowledge to this project to prevent drawbacks when completing this project.