

Universiti Teknologi MARA

**INTELLIGENT PARKING GUIDANCE SYSTEM
OF IMAGE RECOGNITION USING HAAR
CASCADE CLASSIFIER**

ABDUL RAHMAN BIN MOHAMAD ROM

BACHELOR OF COMPUTER SCIENCE (Hons.)

JULY 2020

SUPERVISOR APPROVAL

INTELLIGENT PARKING GUIDANCE SYSTEM OF IMAGE RECOGNITION USING HAAR CASCADE CLASSIFIER

By

ABDUL RAHMAN BIN MOHAMAD ROM
2017542235

This thesis was prepared under the supervision of the project supervisor, Sir Ahmad Firdaus Bin Ahmad Fadzil. It was submitted to the Faculty of Computer and Mathematical Science and was accepted in partial fulfilment of the requirements for the degree of Bachelor of Computer Science (Hons.).

Approved by,


AHMAD FIRDAUS BIN AHMAD FAUZIL
Pensyarah
Fakulti Sains Komputer dan Matematik
Universiti Teknologi MARA (Melaka) Kampus JAK
77300 Merlimau, Melaka

Sir Ahmad Firdaus Bin Ahmad Fadzil
Project Supervisor

JULY 11, 2020

STUDENT DECLARATION

I certify that this thesis and the project to which it refers is the product of my own work and that any idea or quotation from the work of other people, published or otherwise are fully acknowledge in accordance with the standard referring practices of the discipline.



.....

ABDUL RAHMAN BIN MOHAMAD ROM
2017542235

JULY 11, 2020

ABSTRACT

Being able to find and navigate the way to a suitable vacant parking space in today's crowded urban landscape can be stressful and takes too much of time. As a solution, a Parking Guidance System (PGS) is needed to ease the burden of finding the vacant parking. In this technological world, there are a lot of familiar PGS such as sensors system or RFID. But, in this study the Parking Guidance System (PGS) used the image recognition approach which contain an added value to the system because the Parking Guidance System (PGS) is capable to capture the image of the parking. Thus, the user not only can view the data of the parking, but can re-assure the occupancy status of the parking by viewing the latest image of the parking. In term of object detection techniques, this system was implemented by using Haar Cascade Classifier (HCC) which famously known of its capabilities to perform rapid detection. This project follows the Iterative methodology which famously known to produce a system with fast delivery. The functional and accuracy testing have been conducted for the purpose of the correctness of the system and also the accuracy of the model. The result of accuracy testing shows that this system is capable to accurately detecting the occupancy status of the parking at the rate of 97.14% under the condition of good lighting. Meanwhile, 100% of the system is functional as required in the functional requirement. The significance of this project is to ease the burden of the student in UiTM Jasin to find a vacant parking. This system can also store the data of the parking, which could be used for the future work, such as predicting the parking and also parking data visualization.

TABLE OF CONTENTS

CONTENT	PAGE
SUPERVISOR APPROVAL	i
STUDENT DECLARATION	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	ix
LIST OF TABLES	xiii
LIST OF ABBREACTATIONS	xv
CHAPTER ONE: INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Project Objectives	4
1.4 Project Scope	4
1.5 Project Significant	4
CHAPTER TWO: LITERATURE REVIEW	6
2.1 Parking Guidance System	6
2.2 Type of Parking Facilities	7
2.2.1 Surface Parking	9
2.2.2 Structured or Underground Parking	10
2.3 Type of Parking Guidance System	11
2.3.1 Parking Sensors	11
2.3.2 Radio-Frequency Identification (RFID)	13