

Universiti Teknologi MARA

**Smart Car Parking System using IR
Sensor**

Muhamad Muzhafar Bin Abd Kadir

**Thesis submitted in fulfilment of the requirements for
Bachelor of Information Technology (Hons.)
Faculty of Computer and Mathematical Sciences**

July 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.



.....
MUHAMAD MUZHAFAR BIN ABD KADIR
2018638482

JULY 17, 2020

ABSTRACT

The Smart Car Parking System using IR Sensor is a system that is developed to display the vacant or available parking slot. This Smart Parking system integrates a sensor which is called Infrared Sensor with an LCD Screen. The sensor is used to detect the absence or presence of a car when it enters the parking slot. The LCD Screen is then used to display the vacant parking slot to the driver. The Smart Parking system is developed using the Internet of Things technology. The purpose of the Smart Parking system is to help or assist drivers in finding a vacant parking slot. Furthermore, this system can also record the status of a parking slot and the exact time a car enters or exits a parking slot. The data of the recorded status and time which consist of numbers will be stored in the database for the use of the Administrative management. Thus, this system will also help the drivers in reducing their time spent in finding vacant parking slots. As such, the drivers save their energy and will help reduce the traffic congestion in the parking area. The development of the Smart Parking system is using the System Development Life Cycle (SDLC) by implementing the waterfall model as the methodology. A user acceptance testing based on Technology Acceptance Model (TAM) was conducted with 30 participants from age 18 – 40 years old to see the acceptance of the system. The test has two parts, the first part was demographic question and the second part was divided into four components and consisted of 12 questions. The result obtained from the testing was positively accepted by most of the participants. Therefore, the proposed system has been proven to be beneficial to the drivers and can also motivate other developers to help contribute to more future projects to help the drivers in finding a vacant parking slot easily.

TABLE OF CONTENTS

CONTENT	PAGE
SUPERVISOR APPROVAL	ii
STUDENT DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	x
LIST OF TABLES	xii
LIST OF ABBREVIATIONS	xiii
CHAPTER ONE: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Research Objectives	4
1.4 Research Scope	4
1.5 Research Significance	5
1.6 Thesis Outline	5
CHAPTER TWO: LITERATURE REVIEW	
2.1 Smart Parking	7
2.1.1 Definition of Smart Parking	7
2.1.2 Advantages of Smart Parking	8
2.2 Technology	9

CHAPTER FOUR: CONSTRUCTION

4.1	Hardware Development	49
4.1.1	NodeMCU board	50
4.1.2	IR Sensor	51
4.1.3	LCD Display	52
4.2	Hardware Setup	53
4.2.1	NodeMCU board setup	53
4.2.2	NodeMCU board setup with IR Sensor	57
4.2.3	NodeMCU board setup with LCD Display	58
4.2.4	NodeMCU board Setup with IR Sensor and LCD Display	61
4.3	Software Requirement	62
4.3.1	XAMPP	62
4.3.2	Notepad++	63
4.3.3	Arduino IDE	64
4.3.4	IR Sensor coding	65
4.3.5	LCD Display coding	66
4.3.6	Combination of IR Sensor and LCD Display coding	67
4.3.7	Sending IR Sensor data to MySQL Database coding	70
4.4	Smart Car Parking System using IR Sensor Database Design	73
4.4.1	Database Structure	73
4.4.2	Irdata Table	74
4.5	Smart Car Parking System using IR Sensor Interface	75
4.5.1	Parking Status page	75
4.6	Simulation	76
4.7	Summary	77

CHAPTER FIVE: RESULT AND ANALYSIS

5.1	User Acceptance Test	78
5.1.1	Background of Participant	79
5.1.2	Analysis of Perceived Ease of Use	80
5.1.3	Analysis of Perceived Usefulness	84
5.1.4	Analysis of Attitude	86