



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF CAR PARK MONITORING

SYSTEM BASED ON IOT

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunication) with Honours.

by

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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 Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Teknologi moden telah mengakibatkan perkembangan yang mendadak dalam sector automobil yang turut menyumbang kepada masalah peningkatan jumlah pemilikan kereta di Malaysia. Penggunaan kereta dalam kadar besar sekarang menyebabkan masalah letak kereta berlaku berpunca daripada keadaan trafik yang padat dan kekurangan tempat untuk meletak kenderaan. Oleh itu, idea untuk membangunkan sistem letak kereta pintar berdasarkan IoT yang memantau penghunian slot tempat letak kereta dalam masa nyata hanya dari telefon pintar muncul. Sistem ini dikawal sepenuhnya oleh Arduino UNO yang disepadukan dengan ESP8266 Wi-Fi modul untuk sambungan tanpa wayar. Tambahan pula, teknologi IR juga dilaksanakan ke dalam sistem ini dengan memasang modul sensor IR di setiap slot letak kereta untuk tujuan pengesanan kenderaan. Ia juga digunakan di pintu masuk tempat letak kereta untuk mengesan kenderaan di pintu pagar bersama dengan motor servo untuk mewakili pembukaan pintu automatik. Akhirnya sekali, untuk sambungan antara peranti dan sistem, aplikasi yang direka menggunakan MIT App Inventor akan mengambil bahagian dalam antara muka aplikasi mudah alih manakala ThingSpeak Cloud akan digunakan untuk komunikasi internet.

ABSTRACT

Modern technology has taken the rapid growth of the automobile industry that leads to the increasing in number of car ownership in Malaysia. The large amount of car today caused the parking problems due to the traffic congestion and a shortage of parking space. Hence, an idea to develop a smart parking system based on IoT that monitor the occupancy of the parking slots in real-time simply from our smart phone appears. This system is entirely controlled by Arduino UNO integrated with ESP8266 Wi-Fi module for wireless connectivity. Moreover, IR technologies also implement into this system by planting IR sensor module at each of the parking slots for the purpose of vehicle detection. It was also utilized at the parking entrance for the vehicle detection at the gate along with the servo motor to represent as automated gate opening. Lastly, for the connectivity between the devices and the system, an application has been designed by using MIT App Inventor that will take part as an interface of mobile application while the ThingSpeak cloud will use for the communication over the internet.

DEDICATION

To my beloved parents,

Rusmadi bin Mustaffa and Darina binti Shaari

All my lectures, especially to Raeihah binti Mohd Zain and friends

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TABLE OF CONTENTS

	PAGE
TABLE OF CONTENTS	x
LIST OF TABLES	xiv
LIST OF FIGURES	xv
LIST OF APPENDICES	xviii
LIST OF SYMBOLS	xix
LIST OF ABBREVIATIONS	xx
CHAPTER 1 INTRODUCTION	1
1.1 Introduction	1
1.2 Background of the Projects	1
1.3 Problem Statement	2
1.4 Objectives	4
1.5 Scopes	4
1.6 Expected Outcomes	4
CHAPTER 2 LITERATURE REVIEW	6
2.1 Introduction	6
2.2 Review on the Previous Smart Parking System.	6

2.2.1	Implementation of Smart Parking Guidance System based on Parking Lots Sensors Networks	6
2.2.2	Smart Parking System for Commercial Stretch in Cities	7
2.2.3	I-SPARK: IoT-Based Smart Parking System	8
2.2.4	IoT-Based Smart Parking System	10
2.2.5	Smart Parking Using Wireless Sensor Network System	11
2.2.6	Smart Urban Parking Detection System	13
2.2.7	Smart Parking Using IoT Technology	14
2.2.8	iParking: an Intelligent Parking System for Large Parking Lots	16
2.2.9	IoT Based Sensor Enabled Smart Car Parking for Advanced Driver Assistance System	18
2.2.10	Smart Parking: Parking Occupancy Monitoring and Visualization System for Smart Cities	19
2.3	Comparison between Previous Projects	21
CHAPTER 3 METHODOLOGY		26
3.1	Introduction	26
3.2	Planning	26
3.2.1	Project Work Plan	26
3.3	Design	28
3.3.1	Block Diagram of the Projects	28

3.4	The Operation Flowchart	28
3.5	Hardware Specification	30
3.5.1	Microcontroller	30
3.5.2	ARDUINO UNO R3 (ATmega328P)	32
3.5.3	ESP8266 Wi-Fi Module	34
3.5.4	Infrared Sensor	35
3.5.5	OLED 12C 128x64 Blue Display	37
3.5.6	Servo Motor	37
3.6	Software Development	38
3.6.1	ARDUINO IDE	38
3.6.2	Proteus 8 Professional	39
3.6.3	MIT App Inventor	40
CHAPTER 4	RESULT AND DISCUSSION	41
4.1	Introduction	41
4.2	Schematic Diagram and Wiring Diagram	41
4.3	Hardware Implementation	42
4.4	Software Implementation	43
4.5	Results	48
4.6	Data analysis	51
4.6.1	Analysis on the time interval for ThingSpeak	51

4.6.2	Analysis on the infrared sensor at parking slots	52
4.6.3	Analysis on all parking slots status in the cloud and mobile application at the same time	53
4.7	Discussion	55
CHAPTER 5	CONCLUSION	57
5.1	Introduction	57
5.2	Conclusion	57
5.3	Recommendation for future work	57
REFERENCES	59	
APPENDIX	61	

LIST OF TABLES

TABLE	TITLE	PAGE
Table 1.1	Possible conditions and corresponding outputs	5
Table 2.1	The comparison between literature reviews	20
Table 3.1	Comparison between 8501, PIC, AVR and ARM Microcontroller	31
Table 3.2	Comparison between ARDUINO UNO and ARDUINO NANO	32
Table 3.3	ARDUINO UNO Technical Specifications	34
Table 3.4	Pin out Details of ESP8266	35
Table 3.5	IR Sensor Pin Descriptions	36

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 1.1	The news from The Star Online in 16 April 2014	2
Figure 1.2	The news from FMT news in 22 November 2018	3
Figure 1.3	The article about “The Real Facts of Traffic Jam and Parking Issues in KL” from blog posted by Wilson Ng On	3
Figure 2.1	The framework of the system (Cai et al., 2015)	7
Figure 2.2	Working flow of process system (Kanteti et al., 2017)	8
Figure 2.3	The block diagram of the system (Chippalkatti et al., 2018)	9
Figure 2.4	Flow chart for monitoring of empty/filled slots in the parking (Chippalkatti et al., 2018)	9
Figure 2.5	Flow chart of the system (Khanna and Anand, 2016)	11
Figure 2.6	Architecture of smart parking using wireless sensor network (Sahfutri et al., 2018)	12
Figure 2.7	Smart parking using wireless sensor network diagram block (Sahfutri et al., 2018)	12
Figure 2.8	The screenshot of android application interface (Zadeh and Cruz, 2016)	13
Figure 2.9	Block diagram of smart urban parking system (Zadeh and Cruz, 2016)	14
Figure 2.10	Flowchart diagram of element architecture (Lookmuang et al., 2018)	15
Figure 2.11	Algorithm of raspberry and cloud API (Lookmuang et al., 2018)	16

Figure 2.12 Algorithm of application operation system (Lookmuang et al., 2018)	16
Figure 2.13 System architecture (Zheng et al., 2015)	17
Figure 2.14 System architecture (Zheng et al., 2015)	18
Figure 2.15 System block diagram (Mahendra et al., 2017)	18
Figure 2.16 Mobile application flowchart (Mahendra et al., 2017)	19
Figure 2.17 System Model	20
Figure 3.1 Overall Flowchart for PSM	27
Figure 3.2 Overview of the project	28
Figure 3.3 The flowchart of the parking system	29
Figure 3.4 Up front view of the ARDUINO UNO	33
Figure 3.5 The labelling part of ARDUINO UNO board	33
Figure 3.6 ESP8266 chip	34
Figure 3.7 ESP8266 pin out	35
Figure 3.8 Infrared sensor module	35
Figure 3.9 IR sensor pin outs	36
Figure 3.10 OLED 12C128x64 Blue Display	37
Figure 3.11 Servo motor	37
Figure 3.12 ARDUINO IDE	38
Figure 3.13 Proteus 8 Professional Software	39
Figure 3.14 MIT App Inventor	40
Figure 4.1 Schematic Diagram	42

Figure 4.2 Library used for this system in Arduino IDE	43
Figure 4.3 Show some of the variable declaration in Arduino IDE	43
Figure 4.4 Show the coding to read the sensors and counting the parking	44
Figure 4.5 Show the coding for servo motor action	44
Figure 4.6 Show the coding to connect ESP8266 Wi-Fi to internet access	45
Figure 4.7 Show the coding to write the data from sensors to the ThingSpeak cloud	45
Figure 4.8 Declaration of variables in MIT App Inventor	46
Figure 4.9 Show the code block to read data from ThingSpeak cloud	47
Figure 4.10 The code block to show parking availability and number of free spaces	47
Figure 4.11 Code block to show the parking slots occupancy	48
Figure 4.12 Parking Model integrated with IoT based platform	49
Figure 4.13 The Infrared sensors planted in parking slot	49
Figure 4.14 The servo motors acts as a gate based on the IR sensors	50
Figure 4.15 Real-time monitoring parking using MIT apps	50
Figure 4.16 Serial monitor in Arduino to show time interval to update data	51
Figure 4.17 Graph Time vs Parking Slot for parking slot 1	52
Figure 4.18 Step chart graphs for all parking slots on ThingSpeak	53
Figure 4.19 The availability for all parking slots in the application	54

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix 1	Gantt Chart Planning for "Projek Sarjana Muda 1"	59
Appendix 2	Gantt Chart Planning for "Projek Sarjana Muda 2"	60
Appendix 3	System Coding	61
Appendix 4	Design Blocks Coding	68

LIST OF SYMBOLS

%	-	Percentage
V	-	Volts
Hz	-	Frequency
Mm	-	milimetre
kB	-	kiloBytes
mA	-	miliampere
g	-	gram
μF	-	micro Farad

LIST OF ABBREVIATIONS

Apps	Application
API	Application Program Interface
AVR	Advance Virtual RISC
CLSC	Local Community Service Centre
DC Motor	Direct Current Motor
FMT	Free Malaysia Today
FYP	Final Year Project
IDE	Integrated Development Environment
IoT	Internet-of-Thing
IP	Internet Protocol
I/O	Input/Output
IR Sensor	Infrared Sensor
LED	Light Emitting Diode
LDR Sensor	Light Crystal Display
Max	Maximum
MQTT	Message Queuing Telemetry Transport
OLED	Organic Light-Emitting Diode
PC	Personal Computer
PHP	Personal Home Page
PIC	Peripheral Interface Controller
RAM	Random Access Memory

ROM	Read Only Memory
RISC	Reduced Instruction Set Computer
SQL	Structured Query Language
TTL	Transistor-Transistor Logic
UART	Universal Asynchronous Receiver Transmitter
Wi-Fi	Wireless Fidelity

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter briefly interpret the view for this project. The clarification provided in this section is about the background of the project, the problem statements, the objectives as a guideline to be achieve, the scope of this project and last but not least the expected outcome of the project.

1.2 Background of the Projects

Currently, modern technologies have made our life became easier and more convenient. Technology has also increased the productivity of almost every industry in the world especially in automotive industry. However, in urban area, the rapid increase of car ownership caused a parking problem due to shortage of parking space and traffic congestion. Although the existing parking system is already a systematic system, but still people need a better way that can help and make them easy in finding their car parking spots. An efficient parking technology is needed to solve the parking management issue that became a major problem. Thus, the idea to develop a smart parking system that can provide an improvement from the existing parking system based on the Internet of Things (IoT) came up.

Generally, the main purpose of this project is to monitor the availability of parking spots based on wireless technology which involve data transmission that collected from the parking zone to another point. So, this project is allowed users to check their parking places by simply just from smartphones. The sensor is planted in the parking zone, which uses IR sensor to detect cars nearby. It also helps drivers locate the nearest available empty parking lot and monitoring the slots status in real time.

1.3 Problem Statement

Nowadays, the rapid increase of car ownership in our country especially in a large city has caused the parking issue face by the driver. In facts, car ownership in Malaysia has already emerged the third highest in the world. The number of people using and buying cars is consider will keep on increasing in time. Therefore, the driver will have to face the parking problem which is not only wasting their time and energy, but it also leads to traffic congestion and air pollution. Moreover, finding available parking spots in daily life is becoming more challenging. A news report from Star Online dated 16 April 2014 highlight that car ownership in Malaysia placing third in the world recorded the higher statistic which is about 93% car ownership. Plus, it also recorded the highest incidence of multiple car ownership globally with 54% of households having more than one car in this country. Another report from FMT news state that the increase in the number of Malaysians using vehicles. Our transport minister, Loke Siew Fook said that the number of Malaysian using vehicles is will increase 1.4 times to 31 million by 2030.



Figure 1.1 The news from The Star Online in 16 April 2014



Figure 1.2 The news from FMT news in 22 November 2018

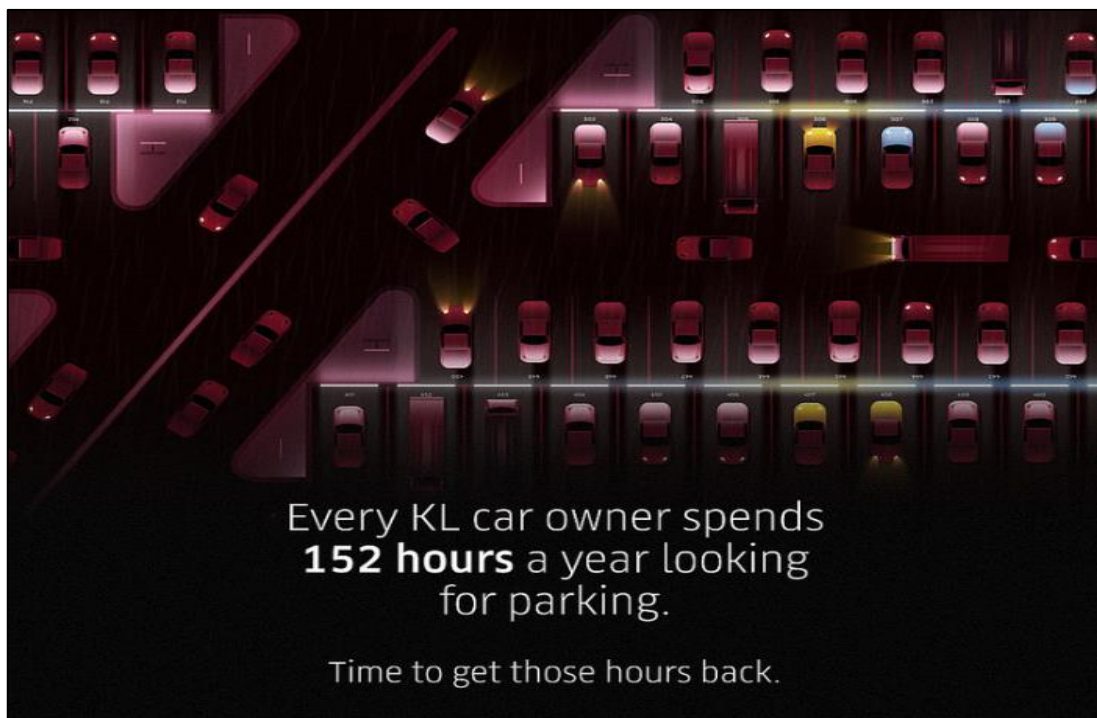


Figure 1.3 The article about “The Real Facts of Traffic Jam and Parking Issues in KL” from blog posted by Wilson Ng On