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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FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

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Sesi Pengajian: 2019

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I hereby, declared this report entitled DEVELOPMENT OF CAR PARK MONITORING SYSTEM BASED ON IoT is the results of my own research except as cited in references.

Signature: ……

Author : NABIL FIKRI BIN RUSMADI

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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:

Signature: …….

Supervisor: RAEIHAH BINTI MOHD ZAIN

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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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.

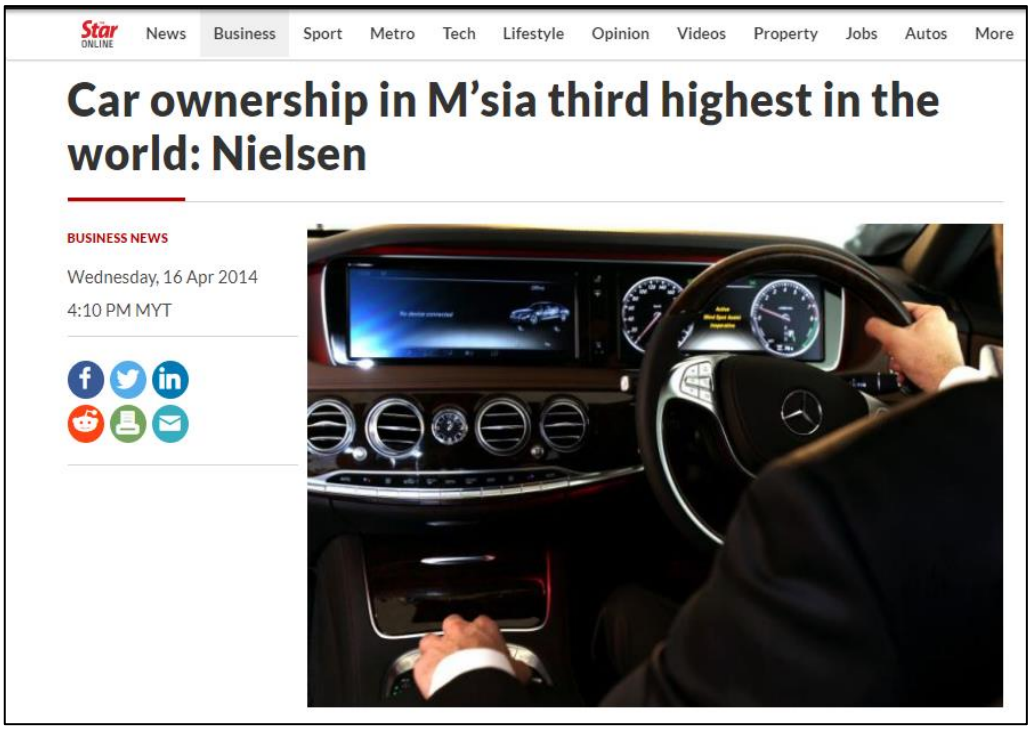

Figure 1.1 The news from The Star Online in 16 April 2014

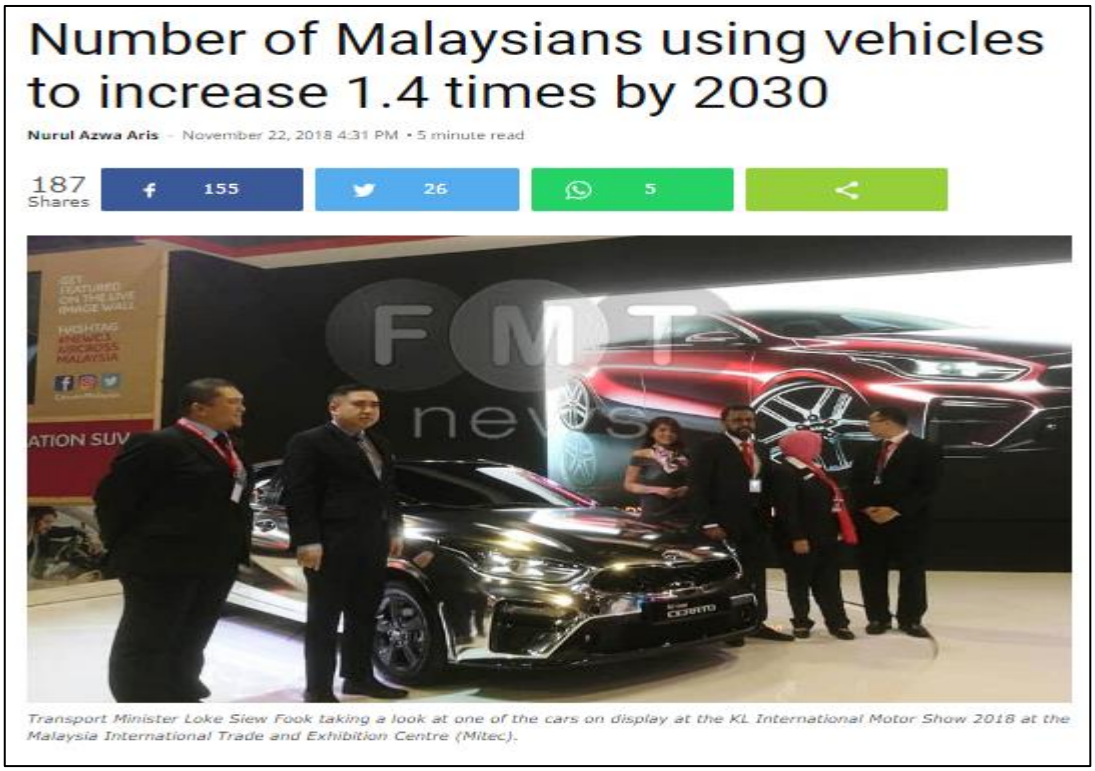

Figure 1.2 The news from FMT news in 22 November 2018

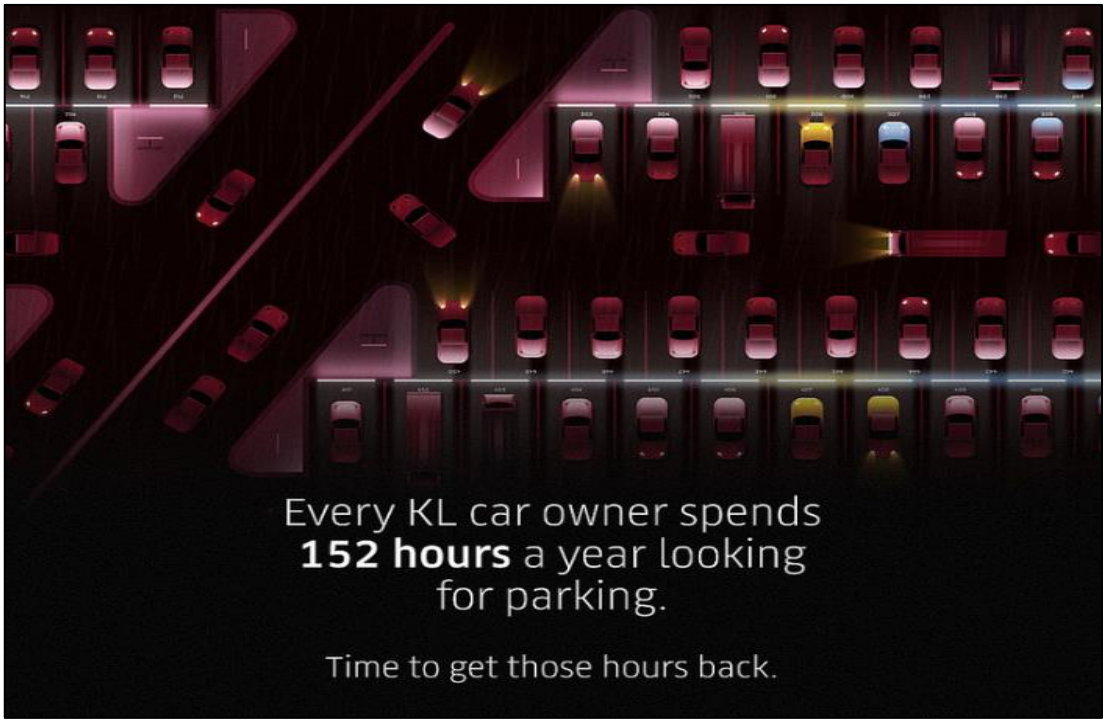

Figure 1.3 The article about "The Real Facts of Traffic Jam and Parking Issues in KL" from blog posted by Wilson Ng On