



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**SMART TRANSPORTATION SYSTEM BY USING IOT**

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

By

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TECHNOLOGY

2019

**BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA**

Tajuk: SMART TRANSPORTATION SYSTEM BY USING IOT

Sesi Pengajian: 2019

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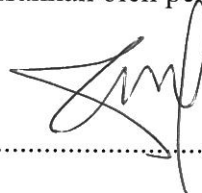
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Signature :  .....

Author's Name : SHEZLIN ANNZI TAN

Date : 16 DECEMBER 2019

## 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 Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

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Supervisor : PUAN NORLEZAH BINTI HASHIM

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Co-supervisor: PUAN DAYANASARI BINTI ABDUL HADI

## ABSTRAK

Dalam kertas ini, sistem pengangkutan pintar dengan menggunakan “Internet of Things” (IoT) sedang dicadangkan. Perkembangan IoT membantu idea bandar pintar menjadi mungkin. Kereta telah menjadi komponen utama perjalanan pergerakan dan juga telah menyebabkan tempat letak kereta juga. Sektor tempat letak kereta sentiasa penting dalam istilah mobiliti bandar kerana ia merupakan komponen utama dalam mencapai tahap akses yang tinggi di pusat bandar. Bilangan tempat letak kereta yang ada berhampiran dengan destinasi pengguna menjadi masalah yang mencabar bagi orang kurang upaya. Kini, orang kurang upaya sukar untuk mencari tempat letak kereta kosong yang berhampiran dengan destinasi mereka. Projek yang dicadangkan ini membantu pengguna kurang upaya menggunakan sistem pengurusan tempat letak kereta yang lebih baik. Objektif projek ini dapat dicapai dengan menggabungkan komponen perkakasan dan komponen perisian. NodeMCU digunakan untuk program sensor ultrasonik yang mengesan kenderaan. Projek ini adalah inovasi dari projek sebelum ini untuk pengguna kurang upaya. Projek ini dapat membantu penyalahgunaan tempat letak kereta kurang berupaya.



## ABSTRACT

In this paper, a smart transportation system by using internet of things (IoT) is being proposed. The development of IoT helps the idea of smart city become possible. Cars have become a key component of mobility journey and also has resulted in the parking as well. The car parking sector has always been importance in term on urban mobility as it is a major component in achieving a high level of accessibility in city centers. The number of available parking spot near to the destination of users is becoming a challenging problem for disability people. Nowadays, it's very hard to find a empty a parking space that is near to their destination. This proposed project helps disability users to experience a better parking management system. The objectives of this project can be achieved by combining the hardware component and software component. The NodeMCU is used to program the ultrasonic sensor that detects the vehicles. This project is the innovation from the previous project help disability users. This project can help people from misuse the disabled parking space.



## **DEDICATION**

This thesis is dedicated to my parent and also my supervisor who always supported me from beginning of my studies. Also, to my friends that always be there give the motivation and inspiration. Lastly, I dedicate this thesis to all.

## ACKNOWLEDGEMENT

This appreciation I give to my beloved supervisor Puan Norlezhah binti Hashim and my co-supervisor Puan Dayanasari Binti Abdul Hadi who have supported me from the beginning of my studied and my project. Also, to my lovely parents Tan Lai Choon and Manja anak Madi for the moral and financial support until I can complete this project. To my siblings, Shirly Tan, Melvina Tan and Ryan Adler Tan, I want to thank them for support from the beginning until and always give me motivation to complete my project. To Joanna, Nur Farahin, Nur Alia Liana, Fitrah Nur Hidayah, and all my friends thank you because keep inspiring me to complete this project. Thank you for those who help me directly or indirectly in completing this project. I appreciate all those helps. Thank you for everything.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter will discuss the overview of this project Smart Transportation System by using Internet of Things (IoT). The objectives, scope of work and problem statement of the project will include in this chapter. NodeMCU will be used to program the system in this project.

A smart transportation system is an advanced application designed to provide innovative services related to various methods of transport and traffic management especially for disabled people. This system enables users to be better informed and to make sure the use of transport networks safer, more coordinated and 'smarter' for disabled people. This may improve transport efficiency in a number of situations such as road transport, traffic management and mobility.

Available parking space nowadays is very limited for places such as office building and shopping complex. This problem is very common presently in this world and it becomes harder for people with disability to find parking near to their destination. In addition nowadays, as there is insufficient parking space some will park their car in the disabled parking space. Thus, in this project the graphic user interface will be

providing which will show the available parking slot and there will be a gate at each of the parking slot to control the parking slot for the disabled people. In this project, the wireless sensor network will implement and will operate with the combination of ultrasonic sensors and servo motor as the gate.

## **1.2 Problem Statement**

Transportation is a major problem for disabled people. Having a car and being able to park near their destination is becoming more difficult for many people with disabilities. People with disabilities face numerous issues with parking in urban areas, including the limited availability of spaces reserved for their use and the illegal use of such spaces.

Due to the growth in population and business activities, urban cities have undergone unparalleled expansion over the past few decades. One of the challenges of a modern urban environment is to be flexible and responsive to the needs of disabled people. The aim in this project is to provide convenient parking access to different places, so that people with disabilities can easily carry out their activities.

Let's imagine a scenario in this case where it's rush hour and traffic in the city center is at its height. As a result, almost all parking spaces are already filled. A person with a physical disability is trying to get to the city center, but sadly they have to drive around to find an empty handicapped parking space, which is obviously a major inconvenience. In fact, due to the high demand for parking spaces, some motorists occupy disabled parking slots without the right to do so and also, in some cases, violators have fake documents displayed on their windscreen.

Hence, this project is conducted to overcome the inadequate parking lot supply for disabled people. This smart transportation project enables users to monitor the parking spots whether it is available and unavailable. The goal of this project is to ensure there is no misuse parking space reserved for disabled people.

### **1.3 Objectives**

Based on the problem statement that had been discussed above, the objectives of this project are:

- To develop a transportation system that has user interface graphical for driver and management.
- To involve wireless communication system, sensor, programming into the parking system.
- To provide better parking management system to avoid misuse parking spaces reserved for people with disability.

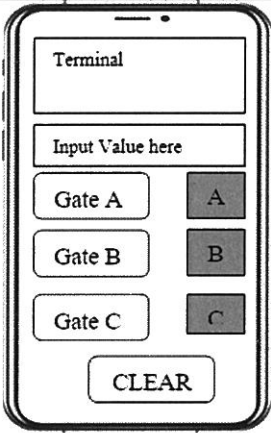
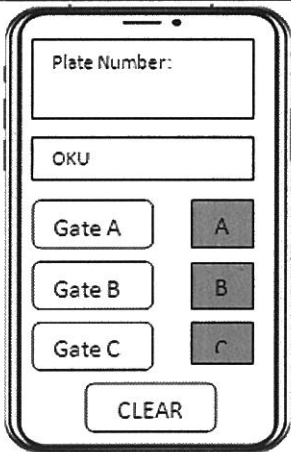
### **1.4 Scope of Work**

The scope of work on this project are established based on the objectives that been mentioned above. The scope of work involve is indoor car park such as underground and multilevel car park. This project assumes that users will follow the procedures when using the smart transportation system. The simulation of this project will only use the car that have smaller scale compared to the actual car where only one parking slot will simulate for this scenario. This project only uses NodeMCU, Ultrasonic sensors and servo motor as the hardware component.

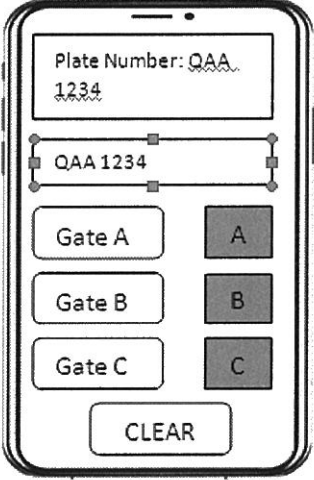
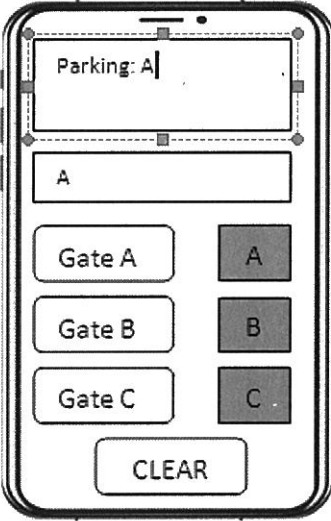
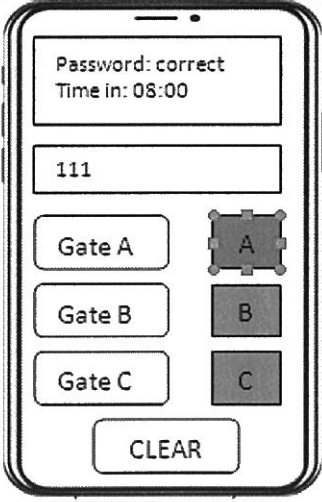
## 1.5 Expected Results

At the end of this research, the smart transportation system enables disabilities user to parked their car at the reserved parking slot for disabled people. Users can choose which parking slot they want to park their car. The system is benefits for users where it can reduce time consumption to find the available parking spot and this system can avoid the misuse of the disabled people parking space. Table 1.5.1 show the expected result gained from this project.

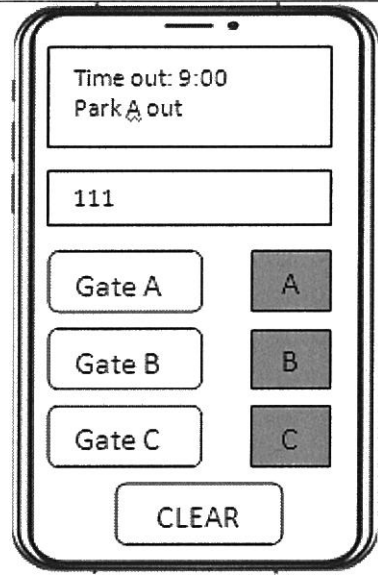
Table 1.5.1 the expected results for this project

|  |  |
|--|--|
| <ul style="list-style-type: none"> <li>- The display when enter the application</li> </ul>   |   |
| <ul style="list-style-type: none"> <li>- Display when enter the "OKU" word</li> <li>- The system asked for the plate number of the user</li> </ul> |  |



|   |   |
|---|---|
| <ul style="list-style-type: none"> <li>- Users entered the plate number</li> </ul>  |  <p>A mobile app interface for parking management. At the top, a text box displays 'Plate Number: QAA 1234'. Below it is an input field containing 'QAA 1234'. There are three buttons labeled 'Gate A', 'Gate B', and 'Gate C'. To the right of each gate button is a corresponding letter button (A, B, or C). At the bottom is a 'CLEAR' button.</p> |
| <ul style="list-style-type: none"> <li>- Users choose to park at the available parking slot</li> </ul>  |  <p>The mobile app interface is similar to the first screenshot. The top text box now says 'Parking: A'. The input field below it contains 'A'. The 'Gate A' button and its corresponding 'A' button are highlighted with a dashed border, indicating they are the selected option.</p>  |
| <ul style="list-style-type: none"> <li>- System will ask user to enter the password of the parking slot chosen by user</li> <li>- There will be time stated at the display after the car parked inside the parking slot</li> <li>- The parking slot turn red</li> </ul> |  <p>The mobile app interface shows the next step. The top text box displays 'Password: correct' and 'Time in: 08:00'. The input field contains '111'. The 'Gate A' button and its corresponding 'A' button are now highlighted with a solid red border, indicating the slot is occupied.</p>  |

- There are time out stated at the display after user park out their car from the parking slot.
- The parking slot will turn back to green which indicates the parking slot is vacant.



## 1.6 Cost involved in this project

Table 1.6.1 Cost involved in this project

| COMPONENT               | UNIT | PRICE (RM)   |
|-------------------------|------|--------------|
| NodeMCU                 | 1    | 35           |
| Female to female jumper | 1    | 4            |
| Breadboard              | 1    | 5            |
| Ultrasonic sensor       | 3    | 12           |
| Servo Motor             | 3    | 23.70        |
| <b>Total</b>            |      | <b>79.70</b> |



## 1.7 Thesis Organization

This project focuses on the Smart Transportation system for the disability people based on IOT by using NodeMCU, Ultrasonic sensors, Servo motor and Blynk application. This report consists of five chapters where for chapter 1 is the introduction of the project. In the chapter 1 the problem statement, objectives and scope of work is explained briefly. In chapter 1 also includes the costs involved in this project.

For chapter 2, the literature review of existing methods a various technology implemented in previous project is discussed. There comparisons of previous project are also included. The applications of IoT are elaborated in this chapter. Besides, in this chapter there will be discussing about hardware component that is related to the previous project.

Next in chapter 3, there is summary of the flowchart in the project. The component and software used in this project will be elaborated further in this chapter. The hardware limitations for the hardware used in this project will be discussed. Also there will be preliminary initial results for this project.

In chapter 4, the results obtained from the system is discussed. Lastly, the conclusion and future recommendation for the project is discussed in chapter 5.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This project is the smart transportation system based on IoT. There are several parts of this chapter. In the first part, the previous project that is related following with the explanation about the Internet of Things is discussed. Also in this chapter there will be explanation about the component related to this project such as sensors, Raspberry pi and Arduino.

#### 2.2 Previous Project Study

Smart cities became popular in this era. Smart cities were more achievable with the help of the internet of things (IoT) evolution. Smart transportation is the major branch of smart cities. IoT can be used to resolve the issues such as traffic congestion, road safety, detection of accidents and limited parking facilities. The smart parking system composed of intelligent sensors utilized on site to monitor and inform the availability of parking space. A mobile or internet application can be created to check the vacant of parking slot. The signboard with embedded RF module which connected