IOT BASED FULLY AUTOMATED SMART PARKING SYSTEM

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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

by

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DECLARATION

I hereby, declared this report entitled IoT based fully automated smart parking system is the results of my own research except as cited in references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

This report is submitted to the Faculty of Electric and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor Electronics Engineering Technology (Industrial Electronics) with Honours. The member of the supervisory is as follow:

Signature: 

Supervisor : AHMAD NIZAM BIN MOHD JAHARI
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ABSTRAK

Dalam beberapa tahun kebelakangan ini, terdapat banyak orang yang menghadapi masalah mencari tempat letak kenderaan. Masalah ini telah menjadi masalah besar dengan peningkatan jumlah kenderaan. Penumpuan kedai dan restoran di bandar juga menjadi faktor kekurangan tempat letak kenderaan dan kesesakan lalu lintas. Dalam projek ini, sebuah system dicadangkan dengan tajuk tempat letak kenderaan pintar secara automatik berasaskan Internet Pelbagai Benda(IPB). IPB merujuk kepada mana-mana peranti yang digunakan untuk membina peranti digital atau bertukar data antara internet dengan peranti. Objektif sistem ini adalah untuk membantu menentukan slot tempat letak kenderaan dan membantu pengguna mendapatkan slot tempat letak kenderaan dengan mudah. Slot tempat letak kereta dapat dikesan dengan menggunakan Arduino Infrared Sensor yang menghubungkan ke modul transceiver NodeMCU dan diprogramkan melalui mikrokontroler Arduino Mega 2560. Aplikasi mudah alih dibuat menggunakan laman web sumber terbuka bernama MIT app inventor. Pengguna boleh memeriksa slot tempat letak kereta dengan aplikasi sebelum mereka pergi ke destinasi. Pengguna juga boleh menempah slot tempat letak kereta dan sistem akan mengemas kini maklumat secara automatik. Oleh itu, sistem ini direka untuk membantu pengguna menjimatkan masa dan bahan keluar kenderaan.

ABSTRACT

There are a lot of people facing a question of vehicle parking in recent years. This problem had become a major problem, as the number of vehicles continuously increased. A factor in the lack of parking slots and traffic jams is also the concentration of shops and restaurants in towns. A fully automated, smart parking system based on Internet of Things (IoT) is proposed in this paper. IoT refers to any system used to create digital devices or to share data between the computer and the internet. This system 's objective helped determine the free parking slot, and helped users easily get a parking slot. The parking slot can be detected through the use of Arduino Infrared Sensor, which connects to the NodeMCU transceiver module and is programmed via the Arduino Mega 2560 microcontroller. An open source website called the developer of the MIT app is used to build a smartphone application. With the application, users can check the parking slot before they went to the destination. Users can also book a parking slot and the system will automatically update the information. Thus, this system is designed to help users save their time and fuels consumption.

DEDICATION

This research is dedicated to my parents who give me moral support and motivation when this study is being done. I would also like to dedicate my friends and boss to help me with this project as I face trouble.

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LIST OF SYMBOLS

Mbps	Megabits per second
mA	Mile Ampere
V	Voltage

LIST OF ABBREVIATIONS

PCA	Principal Component Analysis
LED	Light-emitting diode
PWM	Pulse with Modulation
LCD	Liquid Crystal Display
IR	Infrared
LCD	Liquid Crystal Display
API	Application Programming Interface
WiFi	Wireless Fidelity
USB	Universal Serial Bus
LoRa	Long Range
SPI	Serial Peripheral Interface
ICSP	In Circuit Serial Programming
IBM	International Business Machines
RFID	Radio-frequency identification
ATM	Automated Teller Machine

CHAPTER 1

INTRODUCTION

1.1 Introduction

The Internet of Things (IoT) had become a crucial part of our lives. Internet of things helps people improve their living style as they can control their lives. For example, with the implemention of smart devices, it able to automate parking or house. This show that IoT became essential to our life. The two important words in IoT are “internet” and “things”. The internet is an electronic communications network that connected computers network and let peopleshare and receive information around the world. Dictionary meaning of the word “things” is an object that eminent from a living being. The combination of the Internet of Things means that a system interlinks devices, mechanical and digital machines to transmit data over the network without requiring human-to-human transmission. General, IoT began with the best tools for communication. The devices can be monitored, operated by mobile phones or computers that connect through the Internet. Cloud serves as a great IoT partner as a forum for all sensors and it can store and access data.

Arduino is an open-source electronics based on accessible hardware and software. The Arduino project started in 2005 for students in Italy. This project is launched to provide a low cost and a better way to create devices that can use sensors and actuators to communicate with their environments. Arduino board is able to read inputs such as pulse on a push-button or digital input from the sensor and turn it into an output. With the

development of Arduino, it has been used in a lot of different projects and applications. The Arduino software is reasonably flexible for advanced users. This is because it can run on Mac, Windows and also Linux. Arduino widely used in the education region because it is simple, clear programming environment, inexpensive and it also open-source software.

Internet of Things is the main ideal to create a Smart City. Smart cities in all countries are undergoing a huge increase in the number of cars used for transportation. One of the main problems that smart cities faced is lack of car parking and traffic management system. Finding an available parking spot is always a big problem for the driver especially in the city area. It commonly caused more traffic jams and also air pollution as the driver take more time to find a parking slot. Indirectly, it may also cause global warming. Sometimes the driver may go to higher floors when the lower floor is full but there I no guarantee that the driver will get a parking spot there. Cycling around to find a free parking slot not only will make the driver anger and air pollution it also has a risk of occuring accidents in the parking area. Another issue is associated with the money waste of users, most of the parking slot is paid according to the time when you enter the parking slot. The longer the time the higher the parking fees. These problems can be solved if drivers can be informed that their desired destination has parking slot available.

With the development of technology, smartphones have become a necessity for every people on this world. A smart parking system with IoT based system helps to monitor vehicle parking. IoT based smart parking able to help users to find a parking slot through internet. This is because IoT objects are can be exchange information through