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SMART INTELLIGENT PARKING
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BACHELOR OF MECHATRONIC ENGINEERING
MAY 2009

“I hereby declared that I have read through this report and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Mechatronic)”

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SMART INTELLIGENT PARKING

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**A report submitted in partial fulfillment of requirements for the degree of Bachelor
in Electrical Engineering (Mechatronic)**

**Faculty Of Electrical Engineering
UNIVERSITI TEKNIKAL MALAYSIA MELAKA.**

2009

I hereby declared that this report entitle "*Smart Intelligent Parking*" is a result of my own research except as cited in the reference. The report has been not accepted for any degree and is not concurrently submitted in any candidature of any other degree.

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**I dedicate this to my parents, my beloved family, my supervisor, my friends, my
sweetheart and staffs of FKE.**

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ABSTRACT

The smart intelligent parking is the new arena parking at Malaysia. This project is use the microcontroller PIC 16F877A as a controller, sensor as the input and green lamp, red lamp and display as the output. With the smart intelligent parking, the line of parking section have been mark or display, how many parking are leave and it can make the driver easy to know the line have the parking to park their car and the green lamp on when the car has been park at the parking. The red lamp is on when the parking is full and the display will tell the driver with text. With this project the parking at shopping complex, it easy to find by parking and it can reduce the tension and time of the driver to find the parking. The programming uses the MikroC software and to design the circuits use the Proteus software.

ABSTRAK

“Smart Intelligent Parking” adalah satu tempat letak kereta yang baru di Malaysia. Pada projek ini, “microcontroller’ PIC 16F877A digunakan sebagai pengawal kepada sistem ini, “sensor” adalah sebagai masukan, lampu hijau, lampu merah dan juga pelihat sebagai keluaran. Dengan projek smart intelligent parking, setiap bahagian pada tempat letak kereta akan di tanda dan dipaparkan, ia adalah untuk pemandu mengetahui bahawa berapa tempat letak kereta yang kosong atau pun penuh. Hal ini juga, boleh membantu pemandu untuk senang mencari tempat letak kereta dan lampu memudahkan pemandu meletakkan kenderaan mereka di tempat parking yang kosong, lampu hijau akan menyala selepas pemandu meletakkan kereta di petak tempat letak kereta tersebut. Manakala lampu merah akan menyala selepas semua tempat letak kereta sudah penuh dan paparan akan memaparkan tulisan untuk pemandu. Dengan projek ini juga, ia dapat menghilangkan tekanan, memudahkan cari tempat letak kereta dan mencepatkan masa untuk mencari tempat letak kereta. Projek ini menggunakan perisian protues untuk memadankan komponen-komponen yang diigunakan dan perisian mikroC untuk membuat arahan kepada projek ini.

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CHAPTER 1

INTRODUCTION

This chapter will discuss about introduction, objectives, scope and problem statement for this project.

1.1 Introduction of Project

The aim of this project is to develop the new controller for parking which is called “Smart Intelligent Parking”. The PIC16F877A is used as a control unit. It can be programmed and reprogrammed by using MikroC. In this project, there are 3 main parts which are inputs, controller and output. Sensor is used as input, the microcontroller PIC 168F877A is used as a controller and the green lamp, red lamp and text for the display are used as the outputs. The display is used to give information to the user/consumer about the condition of parking area.

Besides, a controller is also should be interfaced with PC to burn the programmer inside it. The controller will be interface with PC by using serial cable and burner. This projects also using Proteus software to design the controller circuit for smart parking intelligent. The controller will be designed and developed followed by specification that suitable with this type of parking. Hardware also can be connected hardware to the controller and observe the result after simulation.

Another important part in this project is the new programming need to be programmed for controller to let the smart parking intelligent operates using MikroC

software. Through it, knowledge in design and using programming language for interfacing should be learned and improved. In this project, the smart parking intelligent use the display to show the quantity of parking are leave or full and also the programming language are important to count the car park at the parking and leave the parking with detected by sensor (limit switch) in parking for that section.

1.2 Objectives and Scope of Project

1.2.1 Objectives

- To design the new arena of the parking.
- To create the smart intelligent parking to be useful for the driver.
- To give information about the how many parking are leave at the line for that parking section to the consumer.

1.2.2 Scopes of the Project

- The projects are used the display to tell the driver it's that section is full parking or not.
- But the driver can know the parking is full when see the light of red lamp and the green light is use to tell the driven are the available to park their car.
- This project are use the sensor (limit switch) to detect the car have park at the parking or not. If not the display well tell the parking are leave.
- The new programs will be programming using MikroC software. This project will be use Proteus software for design control circuit.

1.3 Problem Statement

The project is to show text in the display for driver to know the parking are full or not. For the hardware part, only controller circuit is designed and fabricated. As the microcontroller is integrated into the circuit, the programming of PIC16F877A is required to re-programming. At the end, the highlight is given to the making of interfacing software for the system. The problem also in programming, it need more study in the counting, for this programming, it also like the basic programming counting but, it so tough to do the programming. The sensor also in the problem area because the sensor it's burn because short circuit, so the sensor is change with limit switch same application with sensor. The target board also cannot be the stable current, so in this case, need to change the target board with the universal target board.

1.3.1 Problem Identification

This project is never use at the parking to the shopping complex at Malaysia. Furthermore, the driver so hard to find the parking at shopping complex because their do not know that section have a parking or full. In this project, displays to give information about the how many parking are leave at the line for that parking section. Beside, the driver can easy to find parking with the display show that section is have number of parking or full and solve the pressure or tension to the driver want to find the parking.

The controller circuit is used to controller the output to show how many parking to the driver with text at display. Besides, this project the lamp green and red it want to show that the parking available or full, the green lamp show the parking is available and red lamp show the parking is full. The sensor is use to detect the car park at the parking or not.

Programming the microcontroller is the most critical part of the project. It is essential in enabling the system to counter the parking are leave or the parking are full. The thorough study and good understanding on assembly programming are necessary as to guarantee the smoothness while programming the microcontroller.

CHAPTER 2

LITERATURE REVIEW

This chapter will explain about the review for this project.

2.1 Introduction

The smart intelligent parking has a construct by another project at the world. It also success project that there are made. For this project, the literature reviews that I have review are, Smart-Parking Debuts at Rockridge BART Station at California, USA, Smart Parking and Intelligent Parking System (IPS). This project also uses the three reviews to make this project successfully. That because the review can make the new idea to me design the new arena parking at Malaysia with the lowest cost also.

2.1.1 Smart-Parking Debuts at Rockridge BART Station at California, USA.

The signs are part of a new "Smart Parking" management field trial launched Tuesday, Dec. 7, 2006 by transportation researchers at the University of California, Berkeley, officials at the California Department of Transportation (Caltrans) and the Bay Area Rapid Transit District (BART). As part of the system's deployment, two electronic road signs will be placed to the side of Highway 24's westbound lanes before and after the Caldecott Tunnel.



Figure 2.1: Parking Area.

UC Berkeley researchers are working with Caltrans, which is funding the \$500,000 project, and with BART. This project reflects the leadership role that Caltrans is playing in implementing Intelligent Transportation Systems in California. This program will help reduce congestion by making transit a more practical and convenient travel option and getting vehicles off the road. We are always on the lookout for successful innovative ideas and smart parking technology is certainly one of those.

Users of the Smart Parking system will be limited to three reservations within a two-week period to allow more individuals to try the service. The program will initially be free, but there may be a charge for the smart parking spaces in the future. The parking have a 50 spots have been set aside for the parking.



Figure 2.2: Electronic road signs show how many are leaved.

It's important to point out that this is simply a demonstration project, and it's not designed to solve the parking challenges at the Rockbridge BART station. However, once it's been proven to work, look forward to implementing it at other BART stations to make parking at BART much more convenient for everyone.

The parking spots are monitored by wireless sensors that communicate to solar-powered computerized relay units above the station platform. Once riders park in the spaces, they will need to call an automated system to indicate their arrival. They will be asked to leave their license plate numbers in the recording. The parking spots are monitored by wireless sensors that communicate to solar-powered computerized relay units above the station platform. The number of cars entering and leaving the lot will be counted via the sensors.



Figure 2.3 : Sensor



Figure 2.4: Sensor at ground.

Smart Parking system will be limited to three reservations within a two-week period to allow more individuals to try the service. The program will initially be free, but there may be a charge for the smart parking spaces in the future.

The parking spots are monitored by wireless sensors that communicate to solar-powered computerized relay units above the station platform. Once riders park in the spaces, they will need to call an automated system to indicate their arrival [7].

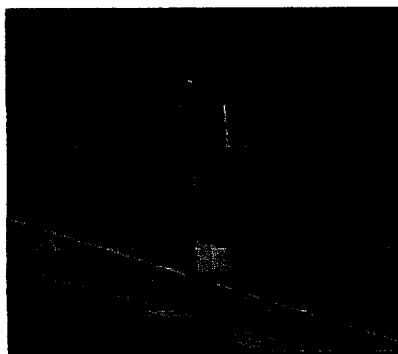


Figure 2.5: Transmitter for wireless.

2.1.2 Smart Parking

This section will present an overview of strategies that address the challenge of planning for parking within the context of smart growth / smart energy. The primary tools to be discussed are tailoring parking requirements, parking management districts, shared parking, demand management techniques, and improved parking facility siting and design. The following section will discuss implementation considerations.

The tailoring parking addressing minimum parking requirements is an important first step toward reducing the oversupply of parking. Minimum parking requirements are the traditional method municipalities use to control the amount of parking, as calculated by the ratio of the number of parking spaces required per square foot, per dwelling unit, or another measure of intensity.

Parking Management Districts (PMDs) are designed to fit the needs of higher density, use districts with an existing or planned centralized shared parking facility. A PMD is regulated by a municipal agency that examines each development or re-development project within its boundaries to assess the appropriate parking approach and number of spaces required. Some of the factors that a PMD can review in the site