ATTENDANCE FREE PARKING COUNTER USING MICROPROCESSOR WITH MAGNETIC SENSOR

MOHD SUFIZ BIN IBRAHIM

This report is submitted in partial fulfillment of requirements for the award of

Bachelor of Electronic Engineering (Telecommunication Electronics)

With Honours

Faculty of Electronic and Computer Engineering

University Technical Malaysia Melaka

May 2008

UNIVERSTI TEKNIKAL MALAYSIA MELAKA

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek	:	**ATTENDANCE FREE PARKING COUNTER USING MICROPROCESSOR AND MAGNETIC SENSOR**
Sesi Pengajian	:	**2008/2009**

Saya **MOHD SUFIZ BIN IBRAHIM** mengaku membenarkan Laporan Projek Sarjana Muda ini disimpan di Perpustakaan dengan syarat-syarat kegunaan seperti berikut:

1. Laporan adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan dibenarkan membuat salinan laporan ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. Sila tandakan (√) :

☐	**SULIT***	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
☐	**TERHAD***	(Mengandungi maklumat terhad yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
☑	**TIDAK TERHAD**	

Disahkan oleh:

_____ _____

(TANDATANGAN PENULIS) (COP DAN TANDATANGAN PENYELIA)

Alamat Tetap: NO42-7, PANGSAPURI
SRI MALAYSIA, KG SRI
MALAYSIA, SG BESI
57100 KUALA LUMPUR

I hereby declare that this report is the result of my work except for quotes as cited in the references."

Signature : ……

Author : MOHD SUFIZ BIN IBRAHIM

Date : 30th APRIL 2009

"I hereby declare that I have read this report and my opinion this report is sufficient in terms of the scope and quality for the award of Bachelor of Electronic Engineering (Telecommunication Electronics) With Honours".

Signature : ……..

Supervisor Name : NURMALA IRDAWATY BINTI HASSAN

Date : 30th APRIL 2009

DEDICATION

This book is dedicated to my parents, family members and friends.

Last but not least, to my lovely supervisor and all the UTeM lecturers.

ACKNOWLEDGEMENT

Alhamdulillah….

Praise to Allah S.WT The Most Gracious, The Most Merciful, there is no power no strength save in Allah, The Highest and The Greatest, whose blessing and guidance have helped me through the process of completing this project. Peace and blessing of Allah be upon our prophet Muhammad S.A.W who has given light to mankind.

My deepest gratitude goes to my supervisor Miss. Nurmala Irdawaty binti Hassan at for all the knowledge, motivation and support that he had given me in completing this thesis. Lots of love from deepest of my heart goes to my family especially my parents Mr. Ibrahim bin Jusoh and Mdm. Zainun binti Ngah whom always given me their love and warm support.

I sincerely and almost thanks all of my teachers, lecturers and all of my friends for helping directly or indirectly. May Allah bless all of you. Amin
Thank you very much.

ABSTRACT

The Attendance Free Parking Counter using Magnetic Sensor and Microprocessor is the project to determine the number of free space at car park using magnetic sensor and display at Liquid Crystal Display (LCD). The ability of this project is to count accurately and automatically determine the number of free space at the parking in the real time. The principle objective of this project was to develop a prototype which is fully functional, usable and can sufficiently accurate follow the available number of free space. This project is combination hardware and software for the system. This microcontroller is using PIC (Programmable Interface Controller) to control whole system. The coding is written in MicroC Compiler. The magnetic sensor able to measure the changed in magnetic in Earth surrounding and the number will display on LCD (Liquid Crystal Display). The output of this project is a complete device counter that can count the number available at the parking on LCD and this paper will cover for the whole operation the system of Attendance Free Parking Counter.

ABSTRAK

Projek pengiraan tempat meletak kenderaan ini menggunakan kawalan mikro bersama magnet pengesan adalah projek untuk mengira bilangan tempat letak kenderaan yang masih kosong menggunakan pengesan magnet dan hasil keluarannya akan dipamirkan di "Liquid Crystal Display (LCD). Kebolehan untuk mengira secara tepat and autotafsir bilangan tempat letak kereta yang masih belum digunakan pada masa yang sebenar. Prinsip tujuan projek ini adalah untuk membina prototaip yang lebih berfungsi, berguna dan berkesan mengikut bilangan tempat letak kereta yang masih belum digunakan. Projek ini adalah merupakan adaptasi dari gabungan "hardware" dan perisian. Kawalan mikro ini menggunakan PIC ("Programmable Interface Controller") untuk mengawal seluruh sistem. Teknik pengekodan dilakukan di dalam perisian "MicroC Compiler". Pengesan magnet dapat mengesan perubahan di kawasan sekitar bumi dan bilangan nombor akan ditayangkan di LCD. Hasil daripada projek ini apabila sedia lengkap adalah sebuah alatan yang dapat mengira bilangan tempat letak kenderaan ini yang masih belum diisi dan bilangan itu akan dipamirkan di LCD dan kertas kerja ini akan merangkumi semua operasi yang terlibat di dalam pembangguan di dalam alatan pengira ini.

TABLE OF CONTENTS

2 LITERATURE REVIEW

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

Attendance Free Parking Counter using Magnetic Sensor and Microprocessor helps to display the number of available parking and also to minimize the car parking area. In the global world today, transportation is very important for everyone. Transportation usually used in working, to go somewhere, and easy human life. In that case, the parking space has become a very big problem in this era of modernity; it is become very crucial necessity to avoid the wastage of space in modern era. In places where cars need to be parked, the Attendance Free Parking Counter using Magnetic Sensor and Microprocessor give displayed number available parking for vehicles to park and thus reducing the time searching for available parking space. Here, any number of cars can be parked according to the requirement.

Attendance Free Parking Counter using Magnetic Sensor and Microprocessor is a project combination between software and hardware. This project is to count the number of available parking slot by counting the car enter and out from the parking park. The maximum number of parking was setup to 15 in this project. The number will be increase or decrease follow outgoing and incoming and will be display at LCD using Microprocessor programming.

The scope will cover counting the available parking and display at LCD. The advantage of this project is driver can get known either there is available parking or already full by displaying at Liquid Crystal Display (LCD). The LCD was located at in front of the car park.

The sensor used to sense the changed of magnetic field surrounding. The ambient magnetic field changes as a vehicle moves along a road and this phenomenon is to remotely detect cars. The counter uses a sophisticated magnetometer sensor to analyze the magnetic field and detect when a vehicle passes. The unit consists of a single box which contains the magnetometer, electronics and batteries. There are no external cables or controls. The unit is simply placed beside the car park entrance, and can be installed very quickly without any specialized equipment or knowledge.

The main sections of this model are:

1. PIC16F877A.
2. Magnetic Sensor 1021s Honeywell.
3. LCD 2 x 16.
4. Proteus Software.
5. MicroC Software.

The advantage of Attendance Free Parking Counter using Magnetic Sensor with Microprocessor is the counter device that counts the number of available parking. The system device will upgrade with stored information data such as time, date and the number of car entered. This device was introduced to improve the car park, to save fuel, time, and reduce traffic.

1.1 Project Objectives

The main objective of this project is to count the number of free space at the parking space and display the number to the LCD.

i. To built a counting system using microprocessor for counting the number of car in a car parking.
ii. To produce database system for information outgoing and entering car in parking space.
iii. To design system that can detect any changed number of car.
iv. To combine software and hardware in one system.

1.2 Problems Statement

The increased of use cars now days have lead to parking issues and concerns at car parks. Due to various behavior and desires of visitors, car parking problems arise from the moment before visitors enter the car park until after they leave the car park. These car parking problems ranges from user behavior, space utilization, variable and peak demand, engineering design and planning, pricing and parking charges, revenue collection, and traffic. With the system representation, the parking operators and management can make better decisions in choosing solutions to car parking problems. This is main idea of developing Attendance Free Parking Counter using Magnetic Sensor with Microprocessor.

There are a lot of obvious problems occur at the parking place such as spending time to search for a parking space. When entering the parking space especially at a larger area with many numbers of cars inside, searching available space to park is a big problem and will take long time to get one if there are still have available parking. This situation can be more complicated when during on busy hours. This can make the driver take a short cut way to short-stay on the street parking. All this problem look simple but can give big effect to the other drivers; it also can be reduction in accidents due to the happier drivers. This idea is developed Attendance Free Parking Counter using Magnetic Sensor and Microprocessor.

In PSM2, the major problem is when the situation requires a much time spend on program development process to control the system. MicroC software is used to compile the source code for the program. MicroC is popular with developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability. A complete and successful compiled source code is necessary to coding to operate the system. Most of the time was spent on writing the source code for the system. By debugging the error of the error occurred during compiling the coding and correct the error but located the error

is sometime hard and complicated thus make the progress of developing system become slow.

The troubleshooting circuits also become one of the problems when the circuits are complete with soldering and routing root of component. There are three main circuits such as PIC Circuit, Sensor Circuit and Power Divider Circuit. Most of the time also needed when tried to troubleshoot the circuit when the circuit cannot run as desired.

The advantage of this system is the sensor. The sensor chooses based on application. The main function of sensor needed is to sense the car only without sense the interrupting by human or animal. The sensor must sensitive with the physical of car. The other thing that must consider is at system when human or the other thing cross the sensor by pass through. The system will defect any kind of item cross the sensor.

1.3 Scopes of Work.

The preparation of a detailed project scope statement is critical to project success and builds upon the major deliverables, assumptions, and constraints that are documented during project initiation in the preliminary project scope statement. Scope will be described as the characteristics of the product, service, or result that the project was undertaken to create. These characteristics will generally have less detail in early phases and more detail in later phases as the product characteristics are progressively elaborated. While the form and substance of the characteristics will vary, the scope description should always provide sufficient detail to support later project scope planning. Scopes of this project consists;

a) To count free space at the parking.

Target for this project is to calculate the number free space park at parking with correctly. The system will count the number of car entering and leave the car park. By setting the maximum number of the number parking available at car park, the system will count increasing and decreasing follow the number of car enter and out.

b) Display the number of free space and FULL at LCD.

The output of this counter system will be display using LCD. The LCD will display the number of free space parking. The display value depends on counting available number of parking and can increase or decrease based on system.

c) Built system that can count the changed at of number at car parking.

The system must have reliability to counter the number. When the sensor sense any changed from the system, the programming will run either counter up or down. When car entered, the counter will count down. Its means that number of the free parking inside the car park are reduced.

1.4 Short Brief on Methodology.

This Attendance Free Parking Counter using Magnetic Sensor and Microprocessor is developed to improve car parking besides to make methodology parking become easily. The driver can know either there still have free space parking inside or there are full already. The enhancement includes updating database, improving time taken to park a car and adding new added features of parking system using sensor and microprocessor. The information in and out car also can be observed by time, date and how many cars entering parking in hour or in daily. On the other hand, this system will ease human job after all.

The project started with the literature review about the smart parking system, microcontroller, microcontroller programming, PIC 16F877A, Magnetic Sensor and component involve in design and development on Attendance Free Parking Counter using Magnetic Sensor and Microprocessor.

In PSM2, the source code is designing using MicroC Compiler and burn into PIC16F877A. All the schematic circuit involved in this system such as power divider, PIC circuit and Magnetic Sensor circuit was converted into PCB layout using Proteus. The PCB layout was printed and mask on the PCB using UV Light. PCB with the circuit layout was put into automatic etching machine for dissolving the undesired part of copper.

The etching PCB was drilled for inserted the component on the board. The soldering all components was plotted on the board before testing process and troubleshoot circuit. The step of troubleshoot are continues until the finish product obtain.