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P.I.C based sweeper mobile robot / Mohd Rafi Ramli.

P.I.C BASED SWEEPER MOBILE ROBOT

Mohd Rafi Bin Ramli

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P.I.C BASED SWEEPER MOBILE ROBOT

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This report is submitted in partial fulfillment of requirement for the degree


Bachelor of Mechatronic Engineering

Faculty of Electrical Engineering

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“I hereby declared that I have read through this report entitle “P.I.C Based Sweeper Mobile Robot” and found that it has comply the partial fulfillment for awarding he degree of Bachelor of Mechatronic Engineering”

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DEDICATION

“For my beloved mother, Jemaah binti Mohd Sin and father, Ramli bin Yahya”

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ

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ABSTRACT

The PIC based Sweeper Mobile Robot is once robot which function as clean a floor. The robot is designed to execute works that are sweep a dust. The robot is constructing the controller of robot using PIC microcontroller. The purpose of to design a mobile robot is saves time and energy for cleaning a floor. The PIC based Sweeper Mobile Robot one steps a clean on floor. Firstly, the robot will to sweep a dust on a floor using the sweeper. The sweeper is using the electrostatic principle to sweep a dust. After that, the robot will to move on a floor defend on the sensor. The sensor will give an input signal to PIC. The type of sensor is using that the infrared sensor. The infrared sensor can become an input in a system. Then, the output is a motor. The motor is function as to rotate a wheel of robot. The Motor will to move when the signal from their sensor to detect an obstacle. Then PIC will give instruction to the motor for rotate. All the operation will to control with a PIC. The robot mechanisms are sensor, motor, sweep. Indeed, the robot is designed will to solve a problem to a people for clean a floor at the home.

ABSTRAK

Robot menyapu bergerak berasaskan PIC adalah suatu robot yang berfungsi sebagai robot pembersih kekotoran pada lantai. Robot ini direka untuk melaksanakan kerja-kerja pembersihan seperti menyapu debu. Pengawal robot ini adalah dibina menggunakan mikropengawal PIC. Ia bertujuan mereka bentuk sebuah robot yang dapat menjimatkan masa dan tenaga bagi proses membersihkan lantai. Robot menyapu bergerak berasaskan PIC mempunyai satu langkah untuk membersihkan lantai. Mula-mula, robot akan menyapu debu pada lantai menggunakan alat menyapu debu pada badan robot. Alat menyapu debu menggunakan prinsip elektrostatik untuk menyapu debu. Selepas itu, robot akan terus menyapu debu bergantung pada penderia. Penderia akan memberi satu isyarat masukkan kepada PIC. Jenis penderia yang digunakan adalah penderia inframerah dan penderia suiz penghad. Penderia inframerah menjadi satu masukkan dalam suatu sistem. Kemudian, keluaran adalah sebuah motor arus terus. Motor adalah berfungsi sebagai pemutar roda robot. Motor akan berhenti bergerak dan bergantung kepada isyarat daripada penderia ketika mengesan satu halangan. PIC akan memberi arahan kepada motor untuk berputar. Semua operasi akan dikawal dengan menggunakan satu PIC. Antatra Mekanisme-mekanisme robot adalah penderia, motor, pengsapu. Sesungguhnya, robot yang direka ini akan dapat menyelesaikan masalah pembersihan lantai di rumah amya serta menjimatkan tenaga manusia.

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LIST OF ABBREVIATIONS

P.I.C	-	Peripheral Interface Controller
P.B.S.M.R	-	P.I.C Based Sweeper Mobile Robot
SPST	-	Single-Pole, Single-Throw
ADC	-	Analog To Digital Conversion
ADCON	-	A/D Control Register
ADRESL	-	A/D Result Low Registers
ADRESH	-	A/D Result High Registers
A/D	-	Analog To Digital

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CHAPTER 1

INTRODUCTION

1.1 Project Overview

A robot is a virtual or mechanical artificial agent. In practice, it is usually an electro-mechanical system which, by its appearance or movements, conveys a sense that it has intent or agency of its own. The word robot can refer to both physical robots and virtual software agents, but the latter are usually referred to as bots. There is no consensus on which machines qualify as robots, but there is general agreement among experts and the public that robots tend to do some or all of the following: move around, operate a mechanical limb, sense and manipulate their environment, and exhibit intelligent behavior, especially behavior which mimics humans or other animals.

Stories of artificial helpers and companions and attempts to create them have a long history but fully autonomous machines only appeared in the 20th century. The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal from a die casting machine and stack them. Today, commercial and industrial robots are in widespread use performing jobs more cheaply or with greater accuracy and reliability than humans. They are also employed for jobs which are too dirty, dangerous or dull to be suitable for humans. Robots are widely used in manufacturing, assembly and packing, transport, earth and space exploration, surgery, weaponry, laboratory research, and mass production of consumer and industrial goods.

People have a generally positive perception of the robots they actually encounter. Domestic robots for cleaning and maintenance are increasingly common in and around homes. There is anxiety, however, over the economic impact of automation and the threat of robotic weaponry, anxiety which is not helped by the depiction of many villainous,

intelligent, acrobatic robots in popular entertainment. Compared with their fictional counterparts, real robots are still benign, dim-witted and clumsy.

Nowadays, most of the job which to do by human has already taken by the machine or robot. However, there are also jobs that still done by human with manual cleaning equipment, such as sweeping the floor with broom. Refer to this conventional style, there are problems that might occur, that is - not enough time to do this job because most of us are busy with other things like office jobs. Moreover, doing housekeeping is a waste of energy to certain people.

So, the PIC based Sweeper Mobile Robot is designed to solve this kind of problem. This robot is a mobile robot which has a function to clean the floor. Besides that, the robot is using PIC microcontroller as a controller.

The PIC based Sweeper Mobile Robot has one step to clean the floor. The robot will sweep dust or rubbish on the floor into its tank. Indeed, this robot is designed to solve problem for human to clean a floor.

1.2 Problem Statement

A Problem Statement is a brief, three-part overview of a difficulty or lack and the way we propose to address that difficulty or lack. The ultimate goal of a problem statement is to transform a generalized problem into a targeted, well-defined problem - one that can be resolved through focused research and careful decision-making. In that case, this project had problem statement for to solve. That the problems are:

1.2.1 People spend much time to clean floor using conventional cleaning equipment.

Usually, people take a much time for to complete to cleaning a floor. It cause the people will slowly operate job cleaning when using conventional cleaning equipment. It is a problem for a people which obligation makes another job such as office job.

1.2.2 Waste of energy when cleaning the floor.

Indeed, the certain people has assume will waste of energy when cleaning a floor. This people has deem cleaning the floor as easy job to complete. So, the problem is occur to that the people which not enough time for make home job and busy with other jobs.

1.3 Project Objective

The objective is once main component in the project to realize that successfully to achieve. In this project has to objective for achieved and solve that the problem. That the objectives to achieve are:

1.3.1 To design a mobile robot that saves time and energy for cleaning a floor.

This robot is design for solve a kind of problem such spend much time and waste energy when operating cleaning a floor using manually equipment (conventional equipment). Refer to that the conventional style, had more problem and not practical for certain people deem time is important. Like parable a Malays parables 'Time Is Gold'. So, the PIC sweeper mobile robot is design to help to certain people and solve the problem.

1.3.2 To construct the controller of the robot using PIC microcontroller

PIC microcontroller is stands for Programmable Intelligent Computer or Programmable Integrated Circuit. The PIC is main component to construct as controller a robot. This project is using PIC 16f877a as controller. PIC 16f877a is choice because it's very cheap and easy reprogrammable. PIC is function to give instruction to the robot to move and operated.

1.4 Scope Of Project

Each a project has should be a scope for find a goal until completion of project. The scopes of this project are:

1.4.1 To sweep on flat area

The P.I.C Based Sweeper Mobile Robot (P.B.S.M.R) is design and develops for sweep on plat area at home or office. The PSMR is using electrostatic principle for sweep on a flat area.

1.4.2 To use IR sensor as input signal.

The robot is using Infrared Sensor for detect any object or obstacles. The sensor is function as input signal for to send a data when detect any object or obstacles to P.I.C microcontroller

1.4.3 To cleaning a dust on a floor.

The robot will clean a dust only on a floor. Its cause a dust is difficult to clean using conventional cleaning equipment. The PIC Sweeper Mobile robot is using carpet sweeper to sweep a dust on a floor. The carpet sweeper is using electrostatic principle to sweep a dust.

1.5 Project Schedule (Gantt Chart)

Project schedule is very important to manage the project. Project schedule of this project is using Gantt chart. Gantt chart is a graphical representation of the duration of tasks against the progression of time of project. Besides that, it is useful tool for planning and scheduling projects of PIC Based Sweeper Mobile Robot. Then the project schedule

will lists the various activities to be performed in a particular project that requires chronological sequence. Finally, it also to indicate the corresponding starting & finishing times are indicated in front of each activity of project. (See **Appendix A**)

1.6 Summary

At the conclusions, this chapter explained about the introduction and background of project PIC Based Sweeper Mobile Robot. Then, that chapter also has to shows about the problem statement, objective and scope of project. Overall, this chapter to explain how to create a project with the problem occur and solve the project via to design and construct the PIC Based Sweeper Mobile Robot.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review is once a conceptual for analysis of a project. This is a step for find out how to once design and operation of project. There is various a methods for brew a literature review such as analysis a paper work which is related with a project. This method is very important for to assist to completion of project

2.2 First Review: The sweeper robot (Paper Work) by Laurent Houssay

This project is analysis by Graduate Research Assistant Mobile Robotics for Hazardous Laboratory Nuclear & Radiological Engineering Department, University of Florida. This report had explanation about designed to clean the dust on the white lines of the roads, it also follows the kerbed to clean the same side of the road. This robot is autonomous and intelligent that means that it analyses its environment and reacts by itself, it also uses its own source of energy.

The robots are generally designed to execute works that are repetitive or dangerous. This application the work is both repetitive and dangerous. The purpose of this robot is to clean the side of the road that is not accessible because of the traffic. This sweeper robot has two ways to execute this job, the first one is to follow the white line on the road. The other way consists in following the kerbed. The following paper describes the design and the