AN AUTOMATIC HAND WASHER AND DRYER MACHINE

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Bachelor of Electrical Engineering

(Control, Instrumentations & Automation)

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 (Control, Instrumentation and Automation)"

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This report is submitted in Partial fulfillment of Requirements for the Degree of Bachelor in Electrical Engineering (Control, Instrumentation and Automation)

Faculty of Electrical Engineering
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“ I hereby declared that this report is a result of my own work expert for the excerpts that have been cited clearly in the references”

Signature :……

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Special dedicated to

My beloved parents and siblings, who have encouraged, guided and supported me throughout my study life.

Mr.Ahmad Idil B Abdul Rahman and all my friends,

Thanks for guidance and support...

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ABSTRACT

Nowadays, there are almost of the entire place example at restaurants, public houses, offices/industry, school, colleges and universities have the hand washing tool. The functions of this tool are to washing and drying the hands. But normally this tools operating by semi automatic or manual. To give this tool can more systematic and particular ‘an automatic hand washer and drying machine’ for automatically washing and drying the hands is proposed. This project will design to combine three functions in one device which is the soap, water and dryer. The project consists of the microcontroller chip, an Infra-Red (IR) sensor and any other device. The main component that must be used to make sure an automatic hand washing and drying machine operating for automatically is microcontroller chip and the microcontroller chip that be used is PIC16F877A. This microcontroller used to control the whole machine which is water, soap and dryer. The IR sensor consists of an IR transmitter sensor and an IR detector sensor. The IR transmitter sensor will continuously emit an IR wave, forming a straight light from the IR transmitter to the IR detector. When the IR wave between IR transmitter sensor and IR detector sensor is interrupted by user hands, a signal will be send to the PIC 16F877A. Then the PIC 16F877A will analyze the signal and the machine will operated whether produce water, soap or drying process will happen.

ABSTRACT

Pada masa kini,hampir di setiap tempat seperti di restoran,tempat awam,hotel,pejabat/industry,sekolah,kolej dan universiti mempunyai alat pencuci tangan. Fungsi alat ini adalah untuk membersihkan dan mengeringkan tangan. Tetapi kebiasaan alat mencuci tangan yang ada sekarang beroperasi secara separuh automatik. Untuk menjadikan alat ini berfungsi dengan lebih sistematik dan selesa '*Mesin pembasuh dan pengering tangan automatik'* ini dihasilkan. Projek di direkebentuk dengan mengabungkan tiga fungsi dalam satu mesin iaitu pengeluaran sabun, air dan pengering. Projek ini terdiri daripada litar sensor inframerah (IR), mikropengawal PIC dan peranti lain . Komponen PIC 16f877A menjadi komponen utama untuk memastikan mesin ini boleh beroperasi secara automatik. Mikropengawal berperanan sebagai pengawal untuk mengawal operasi mesin ini. Pengawalan ini merangkumi kawalan pada air, sabun dan pengering. Sensor inframerah yang digunakan terdiri daripada sensor pemancar inframerah dan sensor pengesan inframerah. Sensor pemancar inframerah akan sentiasa menghasilkan gelombang inframerah lalu membentuk lampu yang lurus dari pemancar inframerah ke pengesan inframerah. Apabila gelombang inframerah di antara sensor pemancar inframerah dan sensor pengesan inframerah diganggu oleh tangan pengguna, isyarat akan dihantar ke mikropengawal PIC. Seterusnya mikropengawal PIC 16F877A akan membuat analisis isyarat yang diterima dan mesinakan beroperasi samaada mengeluarkan sabun, air ataupun proses pengeringan berlaku

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CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays the technology has developed and grows up very fast. The technology has changed our life became easier. Usually the people wash the hand by manual and bacteria will infection to our when the people touch the pipe. Now the technology is apply when wash the hand where we call it an automatic Hand Washer and dryer machine. This machine became our trend where it made during our wash the hand easier and clean.

The machines have control the water, soap, and dryer in automatically. This project can get publicity from people because it more to easier when use it. These machines perform the wash and increase hand washing compliance better than manual hand washing methods.

This machine is designed to combine three functions in one device which it more systematic and particular. This project will reduce the usage of water because all of the washer hand will be an automatically. Figure 1.1 shows the whole view of the project.

Figure 1.1: Whole view of the project

1.2 Problem Statement

These advances in automatic hand dryers are not limited to air dryers only. There is also automatic hand dryer, but new there is also automatic paper towel dispenser for those who which to use paper instead of water. There was a need for automatic hand washer and dryer machine by combined all 3 functions in one device which is water, soap and dryer to give more systematic and particular. This project is design and build up to overcome some problems such as time using.

The benefits that can get from this devices is that, save the used of water and reduces the waste of paper. Instead of that, the new devices also can avoid us from waste our time because this machine can be function automatically. So, do not need to spend much time to wash and dry hands. It's also a user friendly. All categories of people can use them easily. Just put our hands under the machine and then the sensor in the devices will detect our hands. After that it will function properly. Besides that, the devices that already in market are not so systematic because the users need it take the soap manually.

1.3 Objective Of Project

Everything in the world is done on the objectives that have been set earlier. Without the objectives, the previous might drift away from the right track during the project management. This project focuses on the following five (5) objectives:

i. Design an automatic hand washer and dryer machine by using microcontroller system.
ii. To analyze the function of microcontroller and how apply into this project.
iii. Applying control system using several sensors and other devices.
iv. To study the important parts such as PIC chip, infrared sensor, relay and other devices as hardware part and also studies the C programming language as software part.
v. To design the complete model of an automatic hand washer and dryer machine that can be operated automatically.

1.4 Scope Of The Project

Besides setting up the objectives of the project, the scopes of the project should be setting up earlier. The purpose of setting up the project from begin the project is because to make sure that the project is done according to the specifications that have been desired before. The scopes of the project are:

1. Built a circuit for:
    a. Control circuit (Microcontroller system)
    b. Infrared sensor circuit
    c. Sensor circuit (water level sensor)
    d. Power Supply circuit
2. Develop program for microcontroller (PIC 16F877A).
3. Simulate the program (using Proteus 7 Professional).

4. Hardware-design and build the project.
5. Demonstrate the output of project.

1.5 Report Structure

This report contains of six (6) chapters. The division of each chapter was made according to the project development. The project development was started from the research that has made and was ended with the conclusion that summarizes overall project development. These are the chapters contain inside the report:

a) Introduction

Introduction is discussed about the factors that lead to the development of this project. Besides that, it focuses to the project objectives of the project, scopes of project and structure of the report. The purposes of making this chapter are give a clear view to the reader about the project implementation and process; to make sure the project could satisfy the minimum requirements for bachelor degree final year project; and to make a limitation boundaries for the project so that the project development would not drift from the right track.

b) Literature Review

As there are a lot of projects and researches are being done by many people from all around the world so there will be probability of doing the project that has been done by others. If such phenomenon happens, there will be a wasting time and energy to run a project because a project itself is defined as creating a unique item. Unique item in this case can be interpreted as not doing a project that has been done by others. To avoid the phenomenon from being happens so literature review is implemented.

Literature review is done by researching to the information about many projects done by other researchers through IEEE website. From there, many journals from several of engineering fields that were submitted from many peoples could be analyzed make some comparison about advantages and disadvantages for each project. After that, the decision of proceed one's project could be done.

c) Methodology

Methodology is one of the project parts that describes and discuss in details about the way of any project is conducted. For this project, the methodology includes of project development for every phases starting from the development of small circuit until the testing of every circuit and the completed system.

d) Result

After all process for project development done so the expected outcomes or results are determined. The major parts for this chapter are the explanation of the functionally of the completed system; the project planning (Gantt's Chart) that has been set from the beginning of the project; and the discussion about the problems and constraints that occur during the project development.

e) Discussions and Suggestions

From the results obtained, the discussions could be made in order to study the major important things that could be possibly ignored during project development. Through the discussions session, the strengths and weaknesses of the project could be determined. Any of the weaknesses could be analyzed and the solutions for the weaknesses will be identified instantly. After that, the suggestions for the solutions are discussed briefly for future improvement that will be done by other people who interested with this project.

f) Conclusion

Conclusion is a part that describes the project report in brief. By reading the conclusion, people would know the entire project report development. From there, people could judge the successful of the report and project done from their point of view. Furthermore, people could give opinions to improve the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

This chapter reviews existing project created to get an idea about the project design, conception and any information that related to improve the project. This chapter also explains and discuss about source or article that related to the project. It is consist of the products that have been appeared in the market nowadays. This chapter is also contained the theory of the components, equipments and programming that is used in the project.

2.2 Previous Project

Nowadays, we already have a lot of technologies of an automatic hand washer and dryer machine. So, there are some researches about the types of an automatic hand washer and dryer machine to be used as a guideline in developed the machine for this project. Here, got few last technologies that people out there use for their automatic hand washer and dryer machine.

2.2.1 Automatic Sensor Activated Hand Dryers

Figure 2.1: Automatic Sensor Activated Hand Dryers

This is a fully Automatic Hand Dryers are activated by an infrared sensor when hands are placed under the air outlet. When the user's hands off an automatic hand dryer utilize a maintenance-free brushless motor, capacitor initiated for quick starts. The features include tamper proof bolts and a side mounted heating element which makes the heating element inaccessible through the air outlet. When the control assembly is activated by an infrared optical sensor located next to the air outlet. The dryer shall operate as long as hands are moving under the air outlet. There is a 90 second lockout feature if hands are not removed[1].