SMART WASTE MANAGEMENT FOR AN ECO ENVIRONMENT AT THE HOUSING AREA

MUHAMMAD FARHAN BIN MAJIDAN

Final Year Project Report is submitted in partial fulfilment of the
requirements for the degree of
Bachelor of Engineering (Hons) Electronics Engineering

FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
MALAYSIA

ABSTRACT

With the development and popularization of computer technology, digital technology, and digital equipment are the caused new system is created to replace the previous system. In this paper, the concept of smart waste management system as a whole system is introduced. SketchUp software is utilized to design the flow of the smart waste management system at the housing area. CX – Programmer application is used to create a program that will be transfer to the Programmable Logic Control (PLC). This system is completely program by using ladder diagram programming method. Then, the program being execute by Omron programmable controller. Then, TouchWin is interfaced with the Omron programmable controller via Universal Serial Bus (USB). TouchWin software is used to display the design flow of the system and use as Human Machine Interface (HMI). By using TouchWin designer software, this smart waste management system can easily control on the touch win HMI panel. Basically, this system will be implemented at the housing area. This system also implemented to control the smart waste management system using CX – Programmer and to reduce the carbon emission to the environment. The result from this system showed that it can help to create the better environment. The whole flow of this system has been successfully displayed on the TouchWin HMI panel. The HMI design simulate properly based on the ladder diagram that has been created by using CX – Programmer. The ladder diagram is successfully integrated with the all elements that used in the TouchWin designer software. The objectives for this project are successfully achieved.

ACKNOWLEDGEMENT

In the name of Allah SWT, the Most Gracious, Most Merciful and Most Beneficial, Alhamdulillah for the Lord had given me strength to complete this project.

The successful of the completion of this thesis was made by possible through the invaluable contributions of a numbers of people through thin and thick. To express my gratitude, I would like to say "thank you" for all the contribution that had been made for me to complete the thesis and the report for me to graduation on time with flying colour result.

I would like to dedicate my appreciation to the most individual which is my supervisor that have been helping me and give me guide through completion of this Final Year Project, Dr. Rosidah Sam. She had helped me from the beginning of the Final Year Project 1 that is proposal stage until the end of the Final Year Project 2, thesis. Secondly is to my partners, Nur Erna Adrina Binti Mustari and Khairul Amirin Bin Abdul Rani which also had help me and guide me through this project. They had helped me with a lot of stuff during the development of my project which is from beginning to end of this project.

To all my friends who have lent me a hand to complete this thesis from the beginning until the time of submission. They had given many words as advices for me to move forward. Thank for the words of the encouragement and for helping with my project. My deepest gratitude towards my family also for their non-stop pray and support for my completion of project. Their words are the inspiration for me to move forward to achieve my goals.

Lastly, I would like to express my gratitude to all the people who involve directly or indirectly towards the completion of my project until the completion of my project. With deepest appreciation, Thank You for all the contribution. This research is simply impossible without them that always support me from the beginning until the end of it.

TABLE OF CONTENTS

CHAPTER ONE
INTRODUCTION

1.1   Research Background

Waste is unwanted or unusable materials. There are a few types of wastes such as liquid wastes, solid waste and organic wastes. Being the most debatable environmental issue, solid waste management involves a very challenging engineering solution to ensure its sustainability and suitability to the local waste management condition [1]. The main wastes at the household is organic waste such as food waste, garden waste, manure and rotten meat and solid waste like plastic, paper and tins or metal. Household wastes is one of the factors that leads to the environment pollution which can give negative impact to human health [2]. This because the dumping garbage that expose to the environment contained greenhouse gases such as methane and carbon dioxide [3]. Indirectly, the environment is fulfilled by the greenhouse gases. Every year starting from 2010 to 2015, the waste is increasing year by year until 2020 and the waste generated is expected to increase more [4].

It is possible to prevent negative impact of household wastes on the environment, as well as to improve the household wastes management by make wastes management system than can reduce the negative impact of household wastes from leads to the environment pollution [5]. In this era with high technology, the world is exposed to build smart cities whose features are smart economy, smart mobility, smart environment, smart people and smart living. The dumping household waste is one of the factors that leads to increase the number mass production of bacteria, insects which finally spread different diseases and increase the percentage of greenhouse gases to the environment [6]. To overcome such severe problem, a smart system for the waste management must be developed that can safeguard the environment and reduce the human effort to clean their garbage from overflow by themselves [7].

Programmable Logic Controller (PLC) is recent practice in the industry. PLC also is microprocessor based on control system that can be program to create system and to be sense, activate and control the industrial equipment as well combined all the input and output terminal for interfacing to the system process [8]. The PLC is used to provide flexible, ruggedized and easily to programmable controller to replace hard-

1