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DESIGN AND DEVELOPMENT OF AUTOMATED
SORTING RECYCLE BIN

JURIK RIGUH ANAK AHRAS

B010510022

6 May 2009
“I hereby declare 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)”

Signature : 

Supervisor’s name : MR. MASLAN BIN ZAINON

Moderator’s name : MR. MUHAMMAD KHAIRI BIN ARIPIN

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JURIK RIGUH ANAK AHRAS

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Universiti Teknikal Malaysia Melaka

6 May 2009
"I hereby declared that this report is a result of my own work except for the excerpts that have been cited clearly in the references."

Signature : 

Name : JURIK RIGUH ANAK AHRAS

DATE : 6 May 2009
To my dearly loved father and mother

To all teachers and supervisor
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ABSTRAK

ABSTRACT

Judging by a long enough timeline, the recycling system and outcome has proven to contribute to revenue and increase productivity immensely, in terms of both directly and indirectly. Yet, the actual truth concerning the efficiency of the recycling system has been proven to have failed to reach its maximum standards and potentials. Mainly, one of its major and obvious reasons for this failure is due to the lack of discretion among the general public to recycle or to actually have a keen sense of comprehension towards the need to actually sort recyclable items. Thus, in order to overcome this matter, proper solutions need to be devised and developed. For this project, the solution devised is, to design and to develop a system which would ease the process of sorting of recyclable items, which in this case is this project of, ‘Design and Development of Automated Sorting Recycle Bin’. In turn, the design and development of this system would also intend to encourage as well as change perceptions and mentalities of the general public towards the process of recycling through proficiency and simplicity of this system.
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CHAPTER 1

INTRODUCTION

1.1 Background

The process of recycling recyclable items has been a major boost in many ways to various different parties for so long now ever since advancement in science and technology to recycle everyday household and consumer wastes have been excellently upgraded. The advantages which arrive with this are mainly based on revenue and environmental values. The usage of recycled materials is cheaper than directly raw based materials so from that it would increase profit and revenue. This point encourages industries and omits unjustly waste of items and materials especially consumer wastes which are recyclable. Aside from this, in terms of the environment, recycling could save and cut down on the usage of natural minerals and materials. Environmentally wise as well, recycling would reduce land fill spaces of handling every day waste. This in turn would promote healthy and positive environmental values and to sustain a much better protected environment.
1.2 Problem Statement

Although there have been countless and many different types of efforts carried out by the government and Non Governmental Organizations (NGOs), yet, the recycling system has been proven to have failed to reach its maximum standards and potentials. The main problem for this is due to the absence of proper immediate sorted recycled items when the recyclable items are picked up at their recycle bin locations. The need to sort the items when they are sent to the recycling centers increases the total cost and deficit of the whole recycle system. This is the main reason why this project is conducted, which is to design and develop the current conventional recycle bins which is constantly beleaguered by the problem of unsorted recyclable items by creating a fully automated sorting recycle bin.

1.3 Project Objective

i. To design and develop an automated system of a sorting recycling bin by using Programmable Logic Controller (PLC).

ii. To develop a system which is able to automatically sort recyclable items to overcome unsorted and mix ups.

iii. To develop a system which could improve recycling system.
1.4 Project Scope

i. Study and research on an automated sorting system by using PLC.

ii. Study and design an automated system using CX-Programmer for software development.

iii. Design and develop a prototype with a concept of improving the current recycling system.

iv. Build an automated sorting recycle bin system which would only sort recyclable items to be used mainly for simulation and not an actual size of fully commercialized product.
CHAPTER 2

LITERATURE REVIEW

This chapter would discuss on the ideas and points which help put this project together, linking one part to the other. These reviews helped me very much in my research in order to carry out the development for this project including the background and basis for this whole project – the recycling system. Aside from this, the literature review also consists of future assembly overview mainly concerning the hardware development.

2.1 The Recycling System and Benefits

The recycling process involves processing used materials into new products to prevent the waste of potentially useful materials, reduce air pollution due to incineration and water pollution due to land filling by reducing the need for conventional waste disposal, reduce consumption of fresh raw materials, reduce usage of energy, and lowering emissions of greenhouse gases. Recycling is a key component to modern waste management and it is also the third component of the "Reduce, Reuse, and Recycle" waste hierarchy.
Materials which may be recycled include many types of glass, paper, metal, plastics, textiles, and electronics. Electronics in this case are such as cell phones and computers. Although the effect is similar, the composting or other reuse of biodegradable waste, such as food or garden wastes, is not usually considered recycling. Materials to be recycled are brought either to a collection center or picked up from the curbside, then sorted, cleaned, and finally reprocessed into new materials especially involved in manufacturing industries.

There many benefits which may be obtained from recycling. Some of them are such as:

i. Conserve and protect valuable resources and protect the environment

ii. Promote a clean and healthy environment

iii. Eliminate non bio-degradable waste

iv. Reduce and eliminate landfill spaces

v. Encourage local industries

vi. Stop presenting hazardous waste concerns

2.2 The Failure and Success of Recycling

Recycling is a wonderful example of a very successful collective action. But what is the real contribution of recycling to reducing the amount of waste going into what garbage experts very lyrically call the "waste stream"? If all of this effort has not reduced the volume of garbage produced, then what is the point? Is our goal to reduce garbage production or to increase the amount of recycling? These are issues that require some reflection in our zeal to establish and grow recycling programs.
We have moved the whole system of matter from one level, its inert form, and imposed an artificial degree of order through the manufacturing process. When we have finished our use of the material (a split second in the geological time sense that is the measure of all matter), we return this material to the earth, entombed in a landfill, and begin this cycle anew with virgin materials. How much of this production of waste material could be avoided if we simply began to do away with the very concept of waste. What is the value of devoting society's intellectual capital, a huge amount of natural resources and finite energy supplies to creating containers that last well beyond the products they were designed to house? Why not devote our ingenuity to creating materials, processes and technologies that avoid and reuse these valuable materials as opposed to discarding or, with a fresh expenditure of finite energy, recycling them? [2000, Yeoman & Mckee]

This article reviews the success and failures of recycling in the world community. Based on the article, civilizations could benefit and reap so much from recycling. Yet, even so, the system is deteriorated and down which brings to failure of the system. Aside from this, the article also provides enlightenment concerning realities surrounding today’s every day life and world.

2.3 Programmable Logic Controller Applications

The PLC has an almost limitless number of applications. It can be used to drive relays, LED's, or even digital to analog convertors. If you only require one output to be on at any time, but require more than the eight outputs available, then it would be a simple matter to add decoders to allow up to 256 outputs. This could be useful for a large LED display perhaps. You can similarly expand the inputs up to 128 by adding encoders. The output driver is