DESIGN OF AUTOMATIC CAGE SYSTEM

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MAY 2009

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This Report is Submitted in Partial Fulfillment of Requirements for the Degree of Bachelor in Mechatronic Engineering

Faculty of Electrical Engineering

Universiti Teknikal Malaysia Melaka

MAY 2009

"I hereby declare that I have read this report and in my opinion this report in term of content and quality requirement fulfils the purpose for the conferring of the Degree of Bachelor in Mechatronic Engineering."

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Date : 13 MAY 2009

Specially dedicated to

My beloved father and mother...

My beloved brother and sisters ...

My inspirational motivator...

All my friends,

Thank you for everything...

ACKNOWLEDGEMENT

First of all, I would like to express my thankfulness and gratitude to Allah S.W.T who has given me all the strength that I needed to complete this final year project and also prepare this report.

With this opportunity, I would like to express my gratitude to the Faculty of electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTeM) generally, and especially to my supervisor Mrs Sahazati Binti Md. Rozali for her help, advices and guidance that her gave during this project.

And also to my parents, thanks to them because of their supported me with their prayer and love. Last but no least, I would like to thank all my friends whom have been such wonderful friends to me and also to everyone who was involved in the completion of this project. I would like to thank them for all support and encouragement to me which have given me the courage and wisdom to fulfill my final year project.

Thank you

ABSTRACT

This Final Year Project (FYP) presents design of Automatic Cage System in farming and breeding industrial. This System used the robot to dispense the feed across the tank. This robot will operate in automatically and systematically. This system provide in farming and breeding sector control by hardware and software using PLC. To analyze the effectiveness of robot movement's for Automatic Cage System. In this project, are three cages were used where robot will be dispensing the feed. Programmable Logic Controller (PLC) as a controller and CX Programmer V6 as a software are used for this system. This project span to study on feeding system used in the farming industry. This system used robot as a tool to feeder livestock. This robot moved from cage to other cage where it controlled by PLC. The aim of the project is to fabricate a prototype which operated automatically and systematically. To fabricate the prototype, aluminum is eminent material as a project frame, where this project consist three parts that is a frame, robot (main tank) and circuit box. In this project, have been four circuit type used which is infrared circuit, water level detector circuit, forward reverse circuit and power supply circuit. These projects also give emphasis to used software CX Programmer V6 to entire control the process feeding to livestock. The result from the research of this project show that the robot movement to feeder process could be recorded the time and movement's condition robot. As such, from the result of the concentration the method to reduce interference was identified. Suggestions for future work are made.

ABSTRAK

Projek ini membentangkan tentang merekabentuk Sistem Sangkar Automatik di dalam industri pertanian dan penternakan. Sistem ini menggunakan robot sebagai alat untuk memberi makanan kepada ternakan. Robot ini beroperasi secara automatic dan sistematik. Dalam projek ini, tiga sangkar digunakan dimana robot aa\kan membahagikan makanan.Robot ini bergerak dari kolam ke kolam yang lain untuk memberi makanan dimana ianya dikawal oleh "Programmable Logic Controller (PLC)" dan menggunakan pengisian "CX Programmer V6". Matlamat projek ini adalah untuk menghasilkan satu prototaip pemberian makanan yang beroperasi secara automatik dan sistematik. Untuk menghasilkan prototaip ini, aluminium merupakan bahan utama sebagai rangka projek. dimana terbahagi kepada tiga bahagian iaitu rangka, robot (tangki utama) dan kotak litar. Dalam projek ini, terdapat empat jenis litar yang digunakan iaitu litar infrared, litar pengesan air, litar "forward-reverse" dan litar bekalan kuasa. Projek ini juga memberi penekanan kepada penggunaan pengisian "CX Programmer V6" bagi mengawal keseluruhan perjalanan proses pemberian makanan kepada ternakan. Keputusan yang diperolehi dari hasil pelaksanaan projek ini menunjukkan pergerakan robot untuk proses pemberian makanan dapat diuji dengan mencatat masa dan keadaan pergerakan robot. Oleh itu, cara untuk mengurangkan gangguan dikenalpasti berikutan daripada keputusan yang diperolehi. Penyelidikan lanjutan turut dicadangkan.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Although we are moving towards develop nation status by 2020, agriculture is still relevant. Nowadays, farming and breeding are as important as the crucial sectors. Year by year the numbers of entrepreneurs that get involve in commercialize bird breeding increases. Nowadays, government also encourages people to involve in bird husbandry as an alternative to increase their income and at the same time improving our economy status.

As we know before the development of technology and ICT people were used to the conventional method to bird husbandry. Based on the studies of innovation, creativity and knowledge are channeled into this matter. This innovation will be translated in the implementation of Final Year Project (FYP) namely Automatic Cage System. This automatic cage use mechanical system application and electrical function to provide food and water and clean livestock dung automatically and systematic.

This automatic cage is stay in market, but involved entrepreneurs or users in this field farming and breeding is unable to utilize because need high cost and skill to control. Therefore, this automatic cage facilitate consumer unknowledgeable in the field of technology to utilize this cage with easier and effective lumped get save management cost. The automatic cage system is actually better than manual method.

1.2 Problem Statement

Present in technology becomes integral part in life diurnal. Technology can help and facilitate human make any job. This entered into farming and breeding sector to manage the bird cage. Previously, to manage the bird cage carried out by manually system.

User currently problem faces to give food water and clean the dung. This is because the conventional system is not efficient and systematic to solve this problem that need to continuously provide food, water and clean dung. Besides, user difficult to manage many cages at one time. User whose are many cages difficult to manage all cages be alone in one time because they need to be around the cages every one and then to monitor the poultry. Furthermore, user also consumes more times to manage all cages for give food, water and clean the dung simultaneously.

To solve these problems, an Automatic Cage System had been designed and implemented. After the design of Automatic Cage System, the automation system also had been designed. The automation system had been designed using Programmable Logic Controller (PLC).

1.3 Objective

To achieve the target in this project, the objectives below have been fixing as guidance in how to implement this project to improve its ability. The main objectives for Automatic Cage System are:

1) To design and build the prototype of Automatic Cage System.
2) To study and apply the PLC system to control the Automatic Cage System.
3) To manage the bird cage easily.

1.4 Scope

In order to achieve objective of the project, there are several scope had been outlined. The project scope for implementation these projects are:

1) Design and build the prototype of Automatic Cage System for three cages.
2) Using PLC for control the Automatic Cage System.

CHAPTER 2

LITERATURE REVIEW

Literature review is the study relating with the project would be exercised. Where, project want to be carried out must base to the theory, observation, recitation, understanding and documentation those related with field irons in the fire and have process arrangement and work procedure to make sure travel orderly project. Therefore, something projects want to be implemented must include building aspect project, material and equipment which are used. This matter very important for achieve objective of the project and it can also help in implementing project with more effectiveness, fluent and perfect.

2.1 Previous Research

Nowadays, we already have a lot of technologies of feeding system. So, there are some research about the types of cage to be used as a guideline in developed the automatic cage for this project. Here, got few last technologies that people out there use for their cage system.

2.1.1 Avian Adventure Cage

The Avian Adventure cage is provides additional width and added optional slide-out grates to accommodate varying bird behaviors. The cage dimensions are 28" x 22" x 29" and the total cage height is 63". The optional slide is out grates and will not allow the bird to escape when the grate is not in place. The cage also has a lift off playpen top with a mangrove perch and two food cup holders.

The Avian Adventure cage has one toy hook and four ladders that lock onto the playpen to keep the bird entertained while sitting on top of the cage. The interior stainless steel food bowls are accessible by solid swing open doors. The cage is improved

knockdown design and still without nuts or bolts. It is easily breaks down into a small box for easy transportation and storage.

The cage is specially designed skirts with no more clips or bolts. A storage shelf at the bottom of each cage is function to store food and water. This cage also has a unique locking system for safety their bird and easy to humans manage the bird. The Avian Adventure cage is control by manually system [5]. Figure 2.1 shows the Avian Adventure Cage.

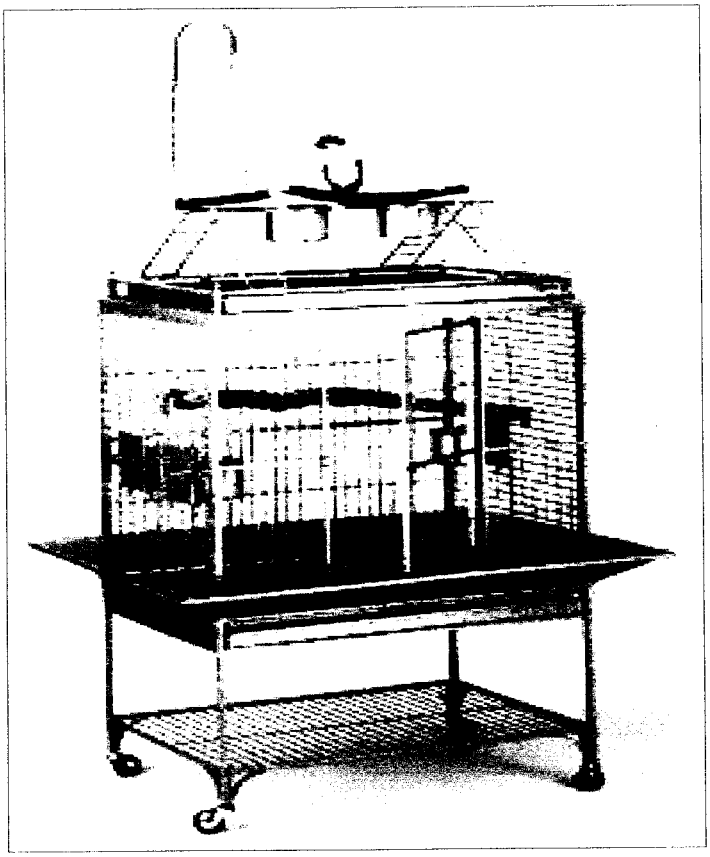

Figure 2.1: Avian Adventure Cage

2.1.2 Large Double Stack Bird Cage

The large double stack bird cage is a beautiful double stack bird cage and it is constructed of steel with a heavy duty, durable baked on powder coat finish. The cage dimensions are 36" width x 28" depth x 70" height and the inside height of each is 29". The wrought from iron steel construction and it is super large double vista cage. [6]

The cage also has a six swing out feeder doors with three on each section and has a six removable stainless cups also with three on each section. Two slide out grates and trays for easy cleaning the bird cage. The cage has two large front doors with steel locking latches for safety the bird and has a four screw in caster wheels for easy moving the cage. This cage also controlled by manually system [6]. Figure 2.2 shows the Large Double Stack Bird Cage.

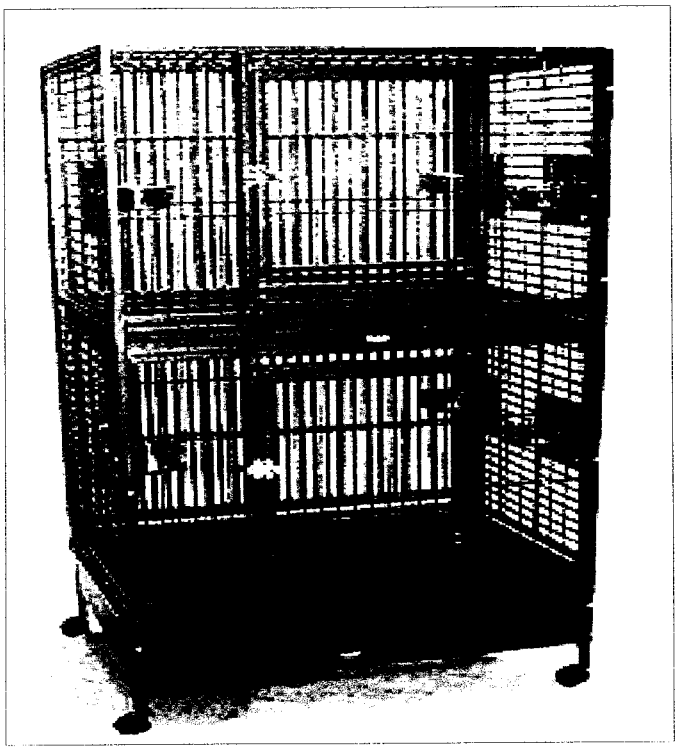

Figure 2.2: Large Double Stack Bird Cage

2.1.3 Comparison

Table 2.1: Comparison between cages

Cage	Operation Method	Controller	Effective
Avian Adventure cage	Static	Manual	No
Large Double Stack Bird Cage	Static	Manual	No
Automatic Cage System	Move	PLC	Yes

Table 2.1 above show the comparisons of cage. Most cage system use manual method such as Avian Adventure Cage and Large Double Stack Bird Cage used manual method as a controller. However, for Programmable Logic Controller (PLC) employing software, yet use in the Automatic Cage System by entrepreneurs.

2.2 Programmable Logic Controller (PLC)

2.2.1 Introduction

A programmable logic controller (PLC) or programmable controller is a digital computer used for automation of industrial processes, such as control of machinery on factory assembly lines. PLCs are used in many different industries and machines such as packaging and semiconductor machines. Unlike general purpose computers, the PLC is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. [1]

PLC controllers are low cost, compact, versatile units based on the standard microprocessor architecture used in the control of machines or processes. They are designed for ease of programming and maintenance. The plc systems replace the old relay logic control systems in automated manufacturing and are designed to provide easy and efficient replacements for the bulky relay logic controllers. [1]

In general, a control system is a collection of electronic devices and equipment which are in place to ensure the stability, accuracy and smooth transition of a process or a manufacturing activity. It takes any form and varies in scale of implementation, from a power plant to a semiconductor machine. Besides signal interfacing to the field devices such as operator panel, motors, sensors, switches, solenoid valves and others, capabilities in network communication enable a big scale implementation and process coordination besides providing greater flexibility in realizing distributed control system. [2]

In PLC implementation, field wiring between the logic elements remains unaltered, but there are no more hard wired connections between the devices. Instead, the connections are stored in computer memory. This allows the programming of these connections, which is in turn made easier as they are entered in ladder logic. Ladder logic is a simple programming technique that requires minimal programming training [4]. Figure 2.3 shows the Programmable Logic Controller (PLC).

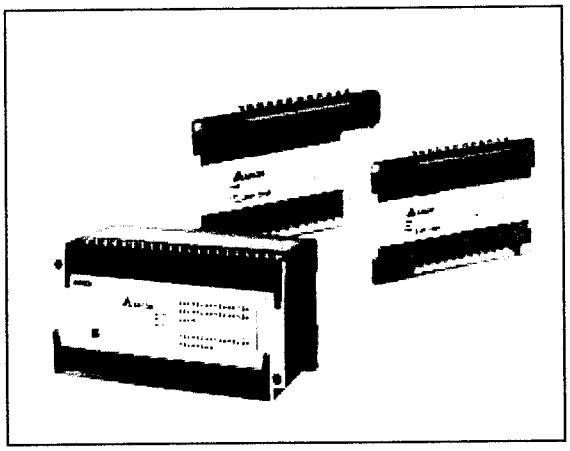

Figure 2.3: Programmable Logic Controller (PLC)

A programmable logic controller (PLC) is a digital electronic device that uses a programmable memory to store instructions and to implement functions such as logic, sequencing, counting, and arithmetic in order to control machines, processes, and has been specifically designed to make programming easily [4]. Figure 2.4 shows the application of PLC.

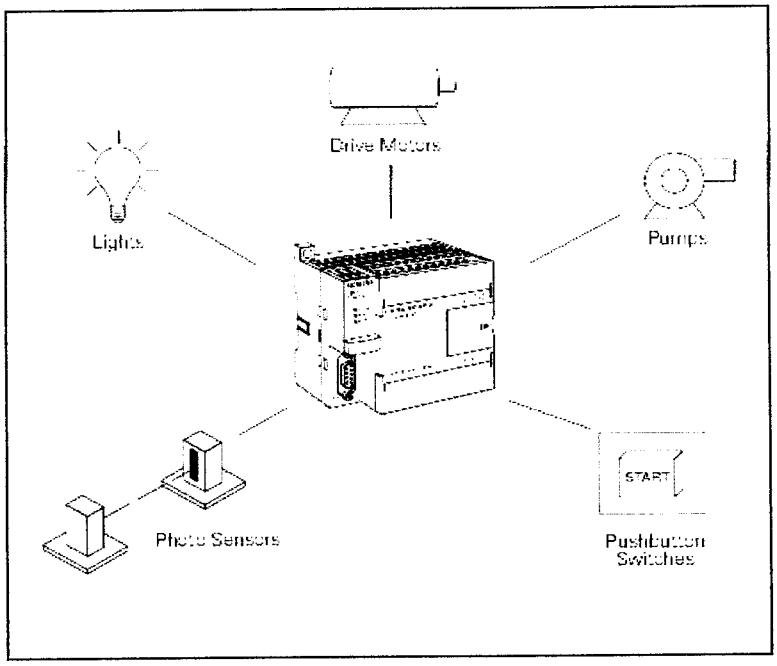

Figure 2.4: Application of PLC

2.2.2 Basic operation of PLC

PLCs consist of input modules or points, a Central Processing Unit (CPU), and output modules or points. An input accepts a variety of digital or analog signals from various field devices (sensors) and converts them into a logic signal that can be used by the CPU. The CPU makes decisions and executes control instructions based on program instructions in memory. Output modules convert control instructions from the CPU into a digital or analog signal that can be used to control various field devices (actuators). A programming device is used to input the desired instructions. These instructions determine what the PLC will do for a specific input. An operator interface device allows process information to be displayed and new control parameters to be entered as shown as in figure 2.5. [4]