

LIVESTOCK AUTOFEEDING AND MONITORING SYSTEM (LIFE)

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of Electronic Engineering (Industrial Electronic)**

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APPROVAL

“I hereby declare that, I have been read this report and in my opinion it has been satisfied the scope and quality needed for Bachelor Electronic Engineering (Electronic Industry).”

Signed :

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Date :

DEDICATION

For my beloved family

For my dearest lecturers

For those who support me and bring me laughter

Sincerely and genuinely from

Mei Ching, Chong

ACKNOWLEDGEMENT

First of all, I would like to take this opportunity to say a million thanks to En MazranEsro for his guidance, advice and inspiration. The knowledge and encouragement given has helped me a lot throughout the completion of project.

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ABSTRACT

The purpose of this final year project is to build a livestock automatic feeding and monitoring system (LIFE). It is a machine that able to automatic feed animals with a fixed amount of food in time. It also able to help farmers reduce time and cost used for the feeding process. This system only can be used to feed grass or hay. Furthermore, this project is system integration but with small part of fabrication, which means the mechanical part of the system need to be designed creatively and fabricated. There are two methods to operate the system, which are setting timer and GSM modem. GSM method runs the system by sending or receiving the text or PDU messages through microcontroller. Then, power window motor is vital to control the latching and releasing process; feeding process will be suspended if the motor not function. Besides, the project was separated into few stages in order to ensure the system can be completed smoothly. Then, the combination of box container and mechanical part of the system was done successfully after test it by using 12 volts power supply This preliminary report will provides the details of literature reviews, discussion about whole process of the project, results been done according to schedule and the future work of the project. In addition, the knowledge by doing this final year project is important because it can be used and applied in real working world after graduated.

ABSTRAK

Tujuan projek tahun akhir ini adalah untuk membina suatu sistem yang mampu memberi makanan dan memantau secara automatik. Sistem tersebut merupakan satu mesin yang dapat menyuap haiwan automatic dalam masa tertentu dengan kuantiti makanan yang ditetapkan. Ia juga dapat membantu penternak mengurangkan kos dan masa yang digunakan semasa proses memberi makanan. Sistem ini hanya boleh digunakan untuk memberi makanan seperti rumput atau rumput kering sahaja. Tambahan pula, projek ini adalah integrasi system dengan sebahagian kecil fabrikasi, maksudnya bahagian mekanikal dalam system itu perlu direkabentuk dengan kreatif dan kemudian menghasilkannya. Sistem ini adalah dijalankan dengan dua kaedah, iaitu menetapkan pemasa dan modem GSM. Kaedah GSM dapat menjalankan system dengan menghantar dan menerima teks atau PDU mesej melalui microchip. Selain itu, motor digunakan dalam projek adalah sangat penting untuk mengawal proses penutupan and pelepasan, ia akan menghentikan proses memberi makanan jika tidak berfungsi. Projek ini dibahagikan kepada beberapa langkah supaya system ini dapat diselesaikan dengan lancar. Kemudian, gabungan kotak dan bahagian mekanikal system tersebut telah berjaya dilengkapkan selepas uji dengan menggunakan bekalan kuasa 12 volt. Laporan ini telah meyediakan butir-butir tentang kajian projek, perbincangan mengenai proses keseluruhan projek, keputusan dan langkah yang akan dilakukan pada masa depan. Di samping itu, pengetahuan tentang projek ini adalah penting kerana iadapatdigunakan dan diaplikasikan semasa bekerja.

TABLE OF CONTENTS

CHAPTER	CONTENTS	PAGES
	PROJECT TITLE	i
	DECLARATION	iii
	APPROVAL	iv
	DEDICATION	v
	ACKNOWLEDGEMENT	vi
	ABSTRACT	vii-viii
	TABLE OF CONTENTS	ix-xiii
	LIST OF TABLES	xiv-xv
	LIST OF FIGURES	xvi-xvii
	LIST OF ABBREVIATIONS/SYMBOLS/TERMS	xviii-xix
	LIST OF APPENDIX	xx

1 INTRODUCTION

1.1	Background	1
1.2	Overview	2
1.3	Project Objectives	2
1.4	Problem Statement	2-3
1.5	Project Scope	3
1.6	Methodology	4

2 LITERATURE REVIEW

2.1	Introduction	5-9
2.2	Visit to Farm (Interview)	10-12
2.3	GSM Modem (MOD-9001D)	13
2.4	Short Message Service (SMS)	14
2.5	AT Commands	14-15
2.6	Microcontroller	15
2.6.1	Microchip	15-16

2.6.2	Atmel	16-17
2.6.3	Selection of Microcontroller	17-20
2.7	Latching and Releasing Motor	21
2.7.1	Door Gun	21-22
2.7.2	Power Window Motor	22-23
2.7.3	Comparison between Both Motors	23-24
2.8	Motor Driver	24
2.8.1	L293D	24-25
2.8.2	H-bridge	25-26
2.8.3	Enhanced 10 ampere DC Motor Driver	26-27
2.8.4	Selection Motor Driver	27

3 METHODOLOGY

3.1	Introduction	28
3.2	Problem Solving Method	28-30
3.3	Flow Chart	30
3.4	Box Container and Mechanical Part (Motor) Design	31
3.5	Schematic Circuit Design	31
3.6	Install and Program GSM Modem through PC	31

3.7	Program Source Code into Microcontroller	31-32
3.8	Project Component Choosing	32
3.8.1	Resistor	32
3.9	Circuit Construction	33
3.9.1	Components Preparation	33
3.9.2	Components Testing	33
3.9.3	Construct Components on PCB	33-34
3.10	Built Complete Prototype	34
3.11	Testing Complete System	34
3.12	Gantt Chart and Milestones	35-36

4 RESULTS

4.1	Hardware Part	37
4.1.1	System Design (Box Container)	38
4.1.2	Mechanical Part Design (Motor)	38-39
4.1.3	Combination of Motor and Box Container	39-40
4.1.4	Hardware Prototype (Excluding Circuit Board)	40-41
4.1.5	Circuit Board	41-44
4.2	Simulation Part	44-47

4.3 Concept of Combination Software and Hardware Part 47-49

5 CONCLUSION

5.1 Conclusion 50-51

5.2 Recommendation 51

\ **REFERENCES** 52-53

APPENDIX A 54-58

APPENDIX B 59

APPENDIX C 60-61

LIST OF TABLES

NO	TITLE	PAGES
Table2.1	Summarize of Dispensing Type for Autofeeding System	8
Table2.2	Comparison between Livestock Autofeeding and Monitoring System and Self-Movable Auto Feeder Dispensing System	11
Table2.3	AT Commands for SMS Function	15
Table2.4	Characteristic of 8051 Microcontroller	19
Table2.5	Comparison between both Microcontrollers	20
Table2.6	Specification of Features of Door Gun	21
Table2.7	Specification of Features of Power Window Motor	23
Table2.8	Summarize for Door Gun and Power Window Motor	23
Table2.9	L293D Features	25
Table2.10	Operation of the Motor in Three Type Motions	26

Table2.11	H-bridge Features	26
Table2.12	Features of MD10C	27
Table2.13	Summarize of Both Types of Motor Driver	27
Table4.1	Function of Components in PIC Microcontroller Board	42-43
Table4.2	Connections of MD10C	43

LIST OF FIGURES

NO	TITLE	PAGES
Figure2.1	Small design of the system, (a) normal type, (b) gravity type	7
Figure2.2	DeLaval feed wagon FCC380 (rail type)	8
Figure2.3	Front and back view of MOD 9001D GSM/GPRS modem	13
Figure2.4	40 pin 16F877A	17
Figure2.5	40 pin 8051	19
Figure2.6	Sample of door gun for car	21
Figure2.7	Lock and unlock process run by door gun	22
Figure2.8	Sample of power window motor for car	22
Figure2.9	(a) Pin connection, (b) motor run in one direction and two directions	24
Figure2.10	H-bridge circuit	25

Figure2.11	MD10C	26
Figure3.1	Flow chart for methodology	30
Figure3.2	Two types of resistors, (a) variable resistor, (b) fixed resistor	32
Figure3.3	Gantt chart for PSM part 1	35
Figure3.4	Gantt chart for PSM part 2	36
Figure4.1	Sketches for box container of the system	38
Figure4.2	Window bracket control by motor to open and close the door of box container	38
Figure4.3	Finish Product of window bracket	39
Figure4.4	Process of the motor open the bottom door of container	39
Figure4.5	Hardware prototype without circuit board	40
Figure4.6	Circuit board	41
Figure4.7	Complete circuit board with LCD	42
Figure4.8	Components in PIC microcontroller board	42
Figure4.9	Connections of MD10C	43
Figure4.10	Simulation circuit	44
Figure4.11	Simulation running process	45-47
Figure4.12	Concept of whole process	47-49

LIST OF ABBREVIATIONS/SYMBOLS/TERMS

GSM	- Global System for Mobile (communications)
PIC	- Programmable Interface Controllers
DC	- Direct Current
LCD	- Liquid Crystal Display
PDU	- Protocol Data Unit
SMS	- Short Message Service
IC	- Integrated Circuit
TMR	- Total Mixed Ration
PMR	- Partial Mixed Ration
CIGR	- Congress of the International Commission of Agricultural and Biosystems Engineering
GPRS	- General Packet Radio Service
TCP/IP	- Transmission Control Protocol / Internet Protocol
RS-232	- Recommended Standard 232
SMSC	- Central Short Message Center
AT	- Attention
MCU	- Microcontroller
VLSI	- Very Large Scale Integrated
CPU	- Central Processing Unit
DIP	- Dual Inline Package

RISC	- Reduced instruction set
CISC	- Complex instruction set
TTL	- Transistor-Transistor Logic
BJT	- Bipolar Junction Transistor
LED	- Light-Emitting Diode
IEEE	- Institute of Electrical and Electronics Engineers
PCB	- Printed Circuit Board
USART	- Universal Asynchronous Receiver Transmitter
RAM	- Random access memory
SRAM	- Static Random Access Memory
EEPROM	- Erasable Programmable Read-Only Memory
PSM	- ProjekSarjanaMuda

LIST OF APPENDIX

APPENDIX	TITLE	PAGES
A	Datasheet PIC 16F877A	54-58
B	Datasheet 8051 microcontroller	59
C	Datasheet motor driver MD10C	60-61

CHAPTER 1

INTRODUCTION

This chapter consists of the background, overview or abstract of the project, project objective, problem statement, project scope and methodology of the project.

1.1 Background

There are various types of automated livestock feeding machine available in the market now. Generally most livestock feeders are commonly for cattle, because the consumer's demand for its meat and milk is very high from all over the world. In addition, this system also widely used for domestic animals like horse, sheep, chicken, and pig, which also having quite large production in the market nowadays.

Actually the idea of this project was came from one of a friend, who told that his father always busy with the stuff of the livestock farm that make his father unable to attend some special events like family day, travelling with family and even worst is he was unable to attend to his daughter's convocation ceremony. Thus, an automatic feeding machine is required to apply in the farm to enable the farmers to have more time to spare with their family.

1.2 Overview

The system for livestock is conceived to automatically run the feeding process by setting the timer. The SMS application through GSM (Global System for Mobile Communication) modem is applied to the system. Besides, this system will use latching and releasing motor (a motor that can do both functions together) for controlling the bottom door of the feeding box to be opened and closed by using direct current (DC) voltage; the motor will be control by a motor driver named MD10C (enable the motor run in forward and reverse direction). There will also consist of a 16x2 lcd (liquid crystal display) to show the output like the clock timer and text messaging (from GSM system).

1.3 Project Objectives

The main objective of the project is to design a programmable system which is able to serve food automatically for livestock in the times that been set. The system does not need an external timer (555 timer) and it only need to write and program the timer source code, then transfer into microcontroller. Second objective is to design a system that able to send messages to user by using GSM method. The text or PDU messaging can be sent through GSM modem after activated the motor in the automatic feeding process by connect and program both of them using microcontroller.

1.4 Problem Statement

The feeding process of animals in feedlot is very time-consuming, especially when feed rations are manually determined for groups of animals. This problem will only progressively get worse since the livestock farms are progressively increasing in size to fulfill the increasing sales; this kind of situation will also cause the cost of manpower becomes more expensive. Moreover, the farmers also cannot take leave and go for holiday for few days because they need to take good care of their livestock everyday due to manual feeding. Besides, the worst thing is that the farmer needs to pay

double or triple salary for those workers who work on special festival like Labor Day, Christmas and even Hari Raya. Thus, this automatic feeder system can help in reducing the cost (reduce manpower) and time, then also can make the farm look more efficient.

1.5 Project Scope

This automatic livestock feeding system only applied on the animals like cattle, goat, and horse which are feeding in barn but not on the prairie, this is because this system maybe will need more maintenance if placed at outside due to some effects from weather and environment. About the SMS application, existing GSM modem from the shelf will be used instead design and construct it. The GSM modem will combine with timer and motor in the feeding process. The feed container will only contain hay or grass; it cannot used to mix grain, corn, sparse milk together with the hay or grass, this is because the mixing food will make it heavier and the latching and releasing motor do not has enough power to support the weight; cause the bottom door of the food container easily open no matter the time set reached or not. Then, this project is system integration, but maybe need some part being fabricated, which include the box container and mechanical part of the system.

1.6 Methodology

Part 1: Design sketches for automatic livestock feeder machine by combine feed container, GSM modem, and motor together.

Part 2: Design the mechanical part about the latching and releasing function.

Part 3: Design a schematic for circuit that show the connection among GSM modem, timer, and motor to the microcontroller.

Part 4: Simulate, analyse, and troubleshoot the circuit ensure that it can run the machine.

Part 5: Test the GSM modem in sending data through microcontroller.

Part 6: Combine all designs by integrating with electronic and actuator,built and fabricate the complete prototype andtest complete system.