UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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DEVELOPMENT OF PUYUH FARM CONTROLLER AND ALERT SYSTEM

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours.

by

SIN SHIAU MEI

B071510051

930203085018

FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

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Desa Pengkalan Mutiara, 31500
Lahat,Perak.

Tarikh: 08/01/2019

Disahkan oleh penyelia:

.....

En. Saifullah Bin Salam
Cop Rasmi Penyelia
SAIFULLAH BIN SALAM
JURUTERA PENGAJAR KANAN
JABATAN TEKNOLOGI KEJURUTERAAN ELEKTRONIK & KOMPUTER
FAKULTI TEKNOLOGI KEJURUTERAAN ELEKTRIK & ELEKTRONIK
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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours. The member of the supervisory is as follow:

Signature: .....

Supervisor : En. Saifullah Bin Salam

SAIFULLAH BIN SALAM
JURUTERA PENGAJAR KANAN
JABATAN TEKNOLOGI KEJURUTERAAN ELEKTRONIK & KOMPUTER
FAKULTI TEKNOLOGI KEJURUTERAAN ELEKTRIK & ELEKTRONIK
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Signature: .....

Co-supervisor: En. Shahrizal Bin Saat

ABSTRAK

Suhu yang luar biasa di Malaysia hari ini memberi kesan pelaksanaan puyuh. Oleh itu, terdapat satu tan permintaan daripada perniagaan grill untuk mengekalkan keadaan semula jadi yang besar dengan memperkenalkan kehangatan mengawal rangka kerja. Walaubagaimanapun, terdapat isu dalam pendekatan untuk menyelaras agregat wilayah penyejukan kusyen kepada had kipas menguras diperkenalkan supaya produktiviti penyejukan didambakan dicapai. Dalam perspektif ini, kehangatan yang mengawal rangka kerja berdasarkan PLC yang boleh mengawal kipas dan lampu dan isyarat akan dihasilkan. Rangka kerja ini kehangatan mengawal akan bekerja dengan kipas ekzos dan lampu juga akan beralih ON. Pada ketika itu, apabila sensor suhu mengesan suhu di dalam rumah ayam adalah lebih tinggi daripada skop yang paling besar suhu, kipas ekzos akan beralih dengan kelajuan tertentu dan buzzer amaran akan dihidupkan. Sesuatu yang lain, apabila suhu di bawah suhu asas jangka, lampu dan buzzer amaran akan bertukar ON. Tujuan dokumen ini adalah untuk melaporkan siasatan dan prestasi hasil prototaip membina-up yang berurusan dengan suhu dan kelembapan kawalan rumah ayam

ABSTRACT

The unusual temperatures in Malaysia today influence the quail's execution. Therefore, there are tons of requests from the grill business to keep great natural conditions by introducing the warmth-controlling framework. Moreover, there is an issue in an approach to coordinate the aggregate cooling cushion territory to the introduced deplete fan limit so that the coveted cooling productivity is accomplished. In perspective of this, a warmth-controlling framework in light of PLC that can control fan and lights and a signal will be produced. The exhaust fan will work the warmth-controlling framework and the lamp will likewise turn ON. At that point, when the temperature sensor senses the temperature in the poultry house is higher than the greatest scope of temperature, the exhaust fan with the certain speed and the alert buzzer will be turned ON. Something else, when the temperature is underneath the base temperature run, the lamp and alert buzzer will be turned ON. The purpose of this document is to report investigation and performance results of the build-up prototype dealing with temperature and humidity control of poultry house.

DEDICATION

I would like to dedicate this project to my supervisor, Mr. Saifullah Bin Salam who had guided me in this project. Besides, I appreciate to Mr. Shahrizal Bin Saat who was my co-supervisor for your assistance and suggestions. At last, I also would like to thank my parents, friends, lecturer and lab assistant who had helped and supported me.

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C	-	Celsius
Hz	-	Hertz
k	-	Kilo
Rh	-	Relative Humidity
V	-	Voltage
°	-	Degree
%	-	Percentage
Ω	-	Ohm
ppm	-	Parts-per Notation

LIST OF ABBREVIATIONS

AC	Alternating Current
DC	Direct Current
DHT	Dihydrotestosterone
GSM	Global System for Mobile
HMI	Human-Machine Interface
IC	Integrated Circuit
NTC	Negative Temperature Coefficient
PIC	Peripheral Interface Controller
PLC	Programmable Logic Controller
RTD	Resistance Temperature Detectors
SMS	Short Message Service
TCR	Thermal Coefficient of Resistance
TCS	Thermal Coefficient of Sensitivity

CHAPTER 1

INTRODUCTION

1.1 Background

In this chapter will explain the title of the project that included project background, problem statement, project objective, project scope, and report outline.

1.2 Project Background

Nowadays, unpredictable heather in Malaysia has a negative influence on the percentage of poultry's grow on a farm. Therefore, the project depicts the environment of quail farm and alert system is controlled by using a programmable logic controller (PLC) application. In addition, temperature and humidity sensor are required work with PLC controller to control lamp and the speed of a fan.

In the project, a temperature and humidity sensor act as an input to measure, surroundings in the poultry house as well as provide a signal to the controller. Whereas, a PLC works as a controller that can control the environment of temperature and humidity level in the poultry house. Moreover, a lamp and an exhaust fan are assembled to act as an output for the project. In addition, a human-machine interface (HMI) and an alert system were used to display the current temperature and provide a notice to users.

The basic operation for the project is the PLC will receive the signal from the inputs to turn ON or OFF the lamp and the speed of exhaust fan based on the programmed codes to provide a suitable and comfortable environment for the poultry house. For the more details, information or data of each component and controllers will be highlighted in chapter 2. The aim of this project is to report the investigation and performance results of the builder-up prototype dealing with temperature and humidity to control the environment of the poultry house.

1.3 Problem Statement

To provide a good environment for the growing of quails is not easy. The body of quail is comfortable in 26 to 38 degrees Celsius. Therefore, a good ventilation plays an important role in the quails. For the ventilation system, a humidity and temperature sensor was used to inform the condition in the poultry house. Overall, if the temperature is high, the temperature sensor will require to release heat and if the level of moisture at a high point, the humidity sensor will require to increase the heat. Thus, this project utilized a temperature and humidity sensor for detecting the situation in the poultry house.

1.4 Problem Objective

The main objectives of this project can be concluded as follow:

i. To study the limitation for build-upping of harmful gases and dust in the quail farm environment.

ii. To design the environment control system of the quail farm by using the PLC application.

iii. To evaluate the performance of the quail farm surroundings controlling system using PLC application prototype.

1.5 Project Scope

The scope of the project is limited to the electrical part and the construction of the miniature prototype for the controlling system. As for the electrical part, this project will concentrate on temperature and humidity controlling system based on the controller application. The system needs to be operated by controlling the exhaust fans and lamps. The project will be designed in such a way, that controller application will be able to control the turning on or off of the lamps and fans, based on the signal received from the sensors. For the prototype part, a prototype of the poultry house will be designed taking into account similarity with the actual environment.

1.6 Report Outline

This report is outlined as follow:

Chapter 1 explains the introduction that includes the concept of temperature and humidity controlling system based on PLC for quail house application. It also outlines the background, problem statement, objectives, and scopes of this project.

Chapter 2 provides a description of the literature review of recent records, circuits and problem statement with regard to the project.

Chapter 3 describes the methodology in order to implement this project. The methodology is illustrated using the flowchart and each of the contents of the flowchart is described in this part.

Chapter 4 explains the simulation result, the data analysis and discussion for this project.

Chapter 5 describes the conclusion after completing the full project and some suggestions are provided to improve this project for future work.

CHAPTER 2

LITERATURE REVIEW

2.1 Background

In this chapter, the purpose is to review journal and previous studies that done by other researchers that relevant to the environment controlling system. In addition, the perspective and method in previous research will be determined and discussed which is related to the project.

2.2 Quail Farm

Sanchita Kadam, 2011 states that the quail, likewise called "bater" in Hindi, is a little kind of feathered creature named as backyard chicken. The bird began from a wild situation similarly as some other tamed creature and was first tamed in Japan in 1595. There are 45 types of quail in the world.

Most of the quails are solitary birds and tend to live a region, so majority spend their time either alone or in a couple with only one other quail. Moreover, they are ready to mate when they are two months old. Therefore, quails will find more open zones to breed. For instance, they find farmland to lay their eggs in their 'home'. For quail's egg, its size could vary between one and 12 eggs depending on the types of quail and the infant of quail chicks incubate out of their eggs within a month.

For the history of quails, the Egyptians understood that quails were a brilliant wellspring of protein for their workers so fix the huge homesteads for breeding them. Quail can sit on six to 12 eggs and the male will help the female to sit if she cannot cover every one of the eggs. While the chicks can walk and feed themselves almost immediately after hatching. Quail can be brought up in either litter or confine framework. Quail cultivating in enclosure framework is more reasonable than bringing them up in profound litter framework. In enclosure framework, the administration is simple and sicknesses or other issue are less. So as to make the quails are splendidly encouraged, the quail should devour around 20 to 25 grams of sustenance every day.

The arrangement of a housing to be utilized depends on the species and size of the quail enterprise. There is three essential housing arrangement accessible for quail farming that is an aviary, the floor and the cage systems based on the size of generation. For aviary systems, it is used to raise and keep exotic quail, either in or out of the doors. While floor systems are usually utilized by small to medium scale enterprises and typically uses existing houses or rooms. Whichever system or combination of the system is utilized, housing surroundings act a vital part and can markedly impact the level performance of the quail enterprise.

2.2.1 Temperature of Quail

Temperature is important for the quail since they are exceedingly skeptical of chills and drafts. The zone of warm neutrality for fed quails is between 35°C and 37°C at one day old, narrowing to 33°C at one week and 31°C at two weeks of age separately.

The action of the quail is a good indication of whether the temperature under the brooder is too high or too low. The temperature is too low when the quail gather together around the brooder. On the other words, the quails are scattered around the edge of the

farm if the temperature is too high. When they move to another side of the pen, there is probably a draft. At the point when the temperature is right, the quail will be evenly spread and seem active as well as content.

2.2.2 The Humidity of Quail Farm

Humidity influence the rate of the feather development and occurrence of respiratory diseases in the growing chick. Low humidity regularly connected with reduced feather growth and poor plumage covering, while high humidity influences the respiration rate, especially when the temperature is also high. The quail will become unable to pant sufficiently fast to dissipate its body warmth and death as often as possible happens if the quail is presented to both high temperature and high humidity. Along these lines, the humidity of the quail farm must be in the 60%.

Brian Fairchild, 2017 states that the major objective of least ventilation is moisture manage, which can be accomplished by keeping up relative humidity (Rh) levels between 40 - 60%. NH3, CO2, and Rh concentrations are absolutely related, since that if Rh is high at that moment NH3, and CO2 will be important as well (Figure 2.1). Maintaining Rh between 40-60% increments the possibility that the NH3 and CO2 gasses will be minus. For instance, it is usually more costly to ventilate a house sufficient to reduce high ammonia that it would have been to just avoid it with optimum least ventilation rates and litter treatments. Litter moisture will rise when the relative humidity surpasses 60%.