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FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

FINAL YEAR PROJECT REPORT

**TITLE: A TEMPERATURE, AMMONIA GAS LEVEL DETECTION AND
NOTIFICATION SYSTEM WITHIN A POULTRY HOUSE.**

BY

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**A final year project submitted to the Department of Computer Engineering in Partial
Fulfillment of the Requirements for the Award of a Bachelor's Degree in Computer
Engineering of Busitema University.**

JANUARY,2023

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DECLARATION

I **NANTALE TRACY CYNTHIA** BU/UG/2018/2405 declare that this project report is my original work and has not been published or submitted before to any university or higher institution of learning.

Sign 

Date 31/01/2023


NANTALE TRACY CYNTHIA BU/UG/2018/2405

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APPROVAL

This is to certify that the project under the title "**a temperature, ammonia gas level detection and notification system within a poultry house**" has been under my supervision and is now ready for examination.

Signature.....

Date..... 28/01/2023

Dr. ODONGTOO GODFREY

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ABSTRACT

In Uganda, the number of poultry farmers has increased greatly so the poultry sector has grown larger. There has been a tremendous expansion of the commercial poultry sector in the last three decades. Though free-range poultry still accounts for a greater population of poultry production in Uganda, some farmers have adopted the deep litter system. There is a need to maintain the environmental conditions in the poultry house to ensure good bird health hence good yields.

Most farmers in Uganda have not adopted modern farming techniques and still rely mainly on traditional methods of farming. These include building traditional poultry house structures, traditional air quality, and temperature control methods such as fire pots and depending on their noses to determine ammonia levels. These methods require a lot of human involvement for better poultry house conditions which is time-consuming, unreliable, and inaccurate thus posing a great risk to the birds.

The temperature, ammonia gas level detection and notification system includes a temperature, moisture, and ammonia sensor that detect temperature, moisture, and ammonia respectively. The results of each are then displayed on the LCD screen in real-time. The system also has a GSM that sends a notification to the farmer when the moisture and ammonia levels are beyond the threshold. When the temperature levels are beyond 27⁰C, the fans are switched on to cool the poultry house. When it is below 27⁰C, the heater goes on to warm the poultry house. This ensures that the poultry house always has optimal environmental conditions hence good poultry yields.

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LIST OF ABBREVIATIONS

GSM	Global System for Mobile Communications
IDE	Integrated Development Environment
ppm	parts per million
NH ₃	Ammonia gas
pH	potential of Hydrogen
SMS	Short Message Service
TDMA	Time Division Multiple Access
CPU	Central Processing Unit
RAM	Random Access Memory
HCT	Highest Critical Temperature
LCD	Liquid Crystal Display
GPRS	General Packet Radio Service

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1 CHAPTER ONE: INTRODUCTION

1.1 Introduction.

This chapter includes the background, the problem statement, the objectives, the justification, significance and the scope.

1.2 BACKGROUND

In Uganda, the number of poultry farmers has increased greatly so the poultry sector has grown larger. There has been a tremendous expansion of the commercial poultry sector in the last three decades. Though free-range poultry still accounts for a greater population of poultry production in Uganda, some farmers have adopted the deep litter system. A deep litter system is a modern method of rearing chickens. They are kept indoors all the time. The structures are large and allow the free movement of chicken. Food and water are also provided for the structure.

Most farmers in Uganda have not adopted modern farming techniques and still rely mainly on traditional methods of farming. These include building traditional poultry house structures, traditional air quality, and temperature control methods such as fire pots and depending on their sense of smell to determine ammonia levels. These methods require a lot of human involvement for better poultry house conditions which is time-consuming, unreliable, and inaccurate thus posing a great risk to the birds. Thus, modern technologies on a poultry farm to control all poultry house parameters like temperature, humidity, and ammonia gas which affect the growth of the chickens are a necessity. If the poultry house conditions are not up to the mark, then they are harmful to digestive, respiratory, and behavioral changes in the chickens. When provided with a suitable atmosphere and proper water, the birds grow rapidly, have good health, and their weight is also increased [1].

Ammonia greatly affects both the birds and the farmers. It is toxic to birds and high levels (above 25ppm) lead to observable changes such as difficulty in breathing, irritation of the trachea, and air sac inflammation. These issues result in a reduction in poultry yield causing farmers huge losses. There is a need to minimize its generation and release to maintain suitable air quality in the poultry house. It has been well established that decreasing litter pH, moisture and temperature will decrease ammonia release. Typically, only the first two options, reduction of litter moisture and pH, are readily available management techniques since poultry house temperature is dictated by bird comfort and health. Even a slight 5% increase in litter moisture from 20 to 25% at 75°F can

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