BUSITEMA UNIVERSITY
Pursuing Excellence

P.O. Box 236, Tororo, Uganda
Gen: +256 - 45 444 8838
Fax: +256 - 45 4436517
Email: info@adm.busitema.ac.ug
www.busitema.ac.ug

**FACULTY OF ENGINEERING AND TECHNOLOGY**.

**DEPARTMENT OF ELECTRICAL ENGINEERING.**

**BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING**

TOPIC

# DESIGNING AN AUTOMATIC SMART POULTRY FEEDER SYSTEM FOR LOCAL FARMERS IN UGANDA

PROJECT REPORT BY:

MWANGANA JOEL (BU/UP/2020/1228)

SUPERVISORS:

MR. MUGWANYA PATRICK

MS. TUSIIMIRE PATIENCE

***This project report is submitted to the department of Electrical Engineering as part of the fulfillment of the requirements for the degree of Bachelor of science in Electrical Engineering at Busitema university.***

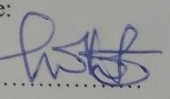
**DECLARATION.**

**DECLARATION.**

I **Mwangana Joel (BU/UP/2020/1228)** declare that the contents in this report are original, as a result of my research, study and has never been submitted to any institution of learning for reward of any academic qualification.

**MWANGANA JOEL**

Signature:



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23rd JUNE, 2024

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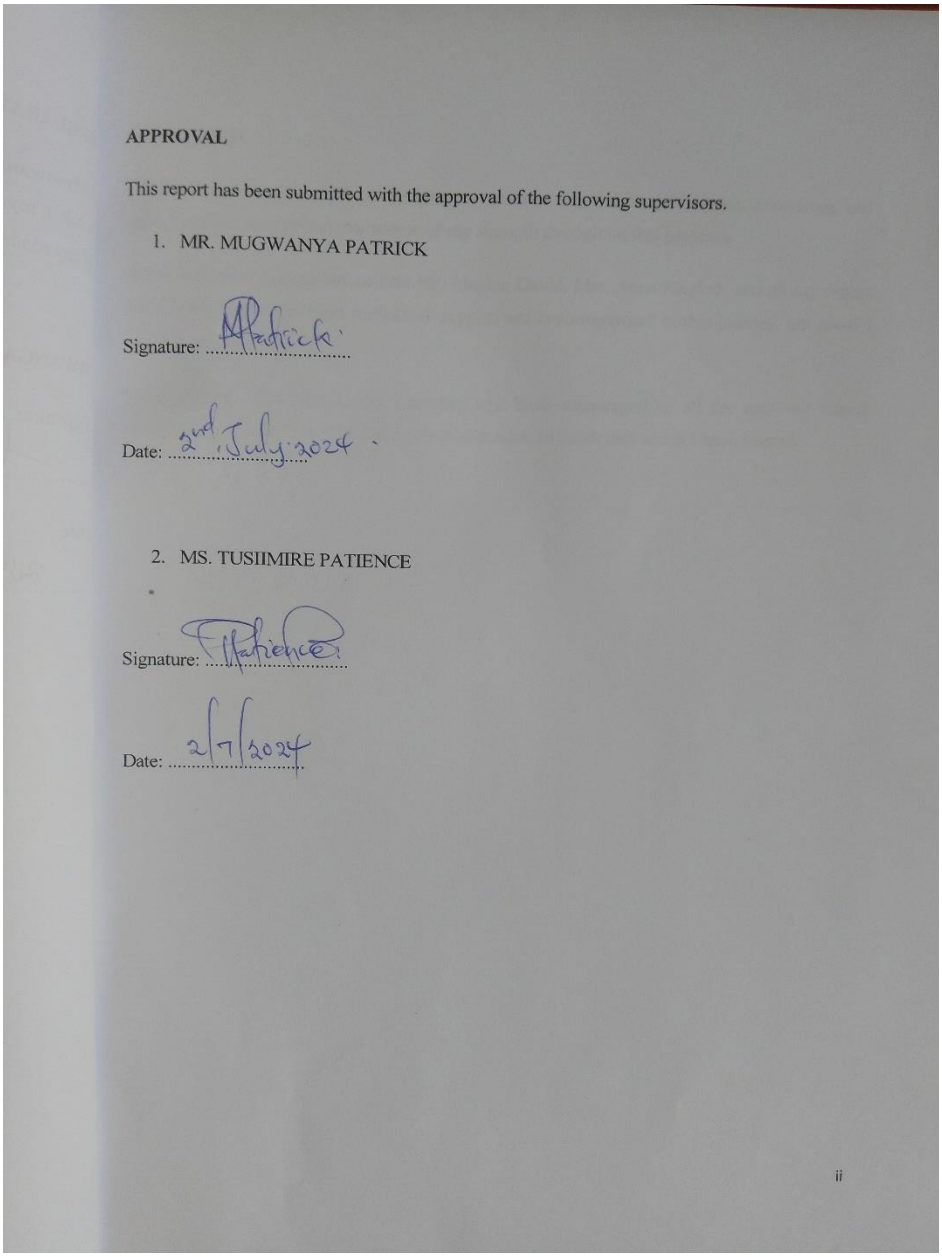
## APPROVAL



APPROVAL

This report has been submitted with the approval of the following supervisors.

1. MR. MUGWANYA PATRICK

Signature: .....

Date: 2nd July 2024

2. MS. TUSIIMIRE PATIENCE

Signature: .....

Date: 2/7/2024

ii

**DEDICATION**

I dedicate this project to God Almighty my creator, my source of wisdom, knowledge and understanding. He has been the source of my strength throughout this program.

Much dedication goes to my parents Mr. Magino David, Mrs. Anna Magino and all my sisters and brother Emma for their continuous support and encouragement in this journey, am always proud of you.

I also dedicate this work to my Lecturers who have encouraged us all the way and whose encouragement has made sure that I give it all it takes to finish that which I have started.

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**LIST OF ACRONIMS**

GSM: Global System for Mobile communication

SIM:  Subscriber Identity Module

D.C: Direct Current

LCD: Liquid Crystal Display

NO: Normally Open

NC: Normally Closed

GPRS: General Packet Radio Service

TCP: Transmission Control Protocol

AVR: Automatic Voltage Regulator

ALU: Arithmetic Logic Unit

CMOS: Complementary Metal oxide Semiconductor

CISC: Complex Instruction Set Computer

## TABLE OF FIGURES

## TABLE OF CONTENTS

**ABSTRACT**

With the creation and use of an Automatic Smart Poultry Feeder System, this project offers a cutting-edge strategy to completely transform the poultry farming industry in Uganda. For many Ugandan farmers, raising poultry is a crucial source of nourishment and money, but conventional feeding techniques are frequently labor-intensive, ineffective, and prone to irregularities. This approach makes use of contemporary technology to solve these issues and provide local farmers with a dependable, automated feeding system that is customized to meet their requirements.

To automate the feeding process, the Automatic Smart Poultry Feeder System combines Arduino microcontroller technology with specialist parts like relays and the L298N motor driver. Scheduled feeding cycles and intelligent sensors to track feed levels are important components that provide the best possible nutrition for chickens while reducing labor-intensive tasks and wasteful feeding.(Corkery et al., 2013)

Through an iterative design and implementation process, interaction with local farmers was carried out to understand their particular requirements and integrate feedback into the system's development. Promising outcomes from field tests and pilot studies showed gains in feed efficiency, chicken health, and overall farm output. These findings emphasize the potential of this approach to boost lives and contribute to the sustainable expansion of the poultry sector in Uganda.

Moving ahead, this initiative aspires to develop collaboration with agricultural stakeholders and promote wider implementation of automated smart technology in chicken production. The goals are to bring about good change, enhance food security, and advance economic growth by providing farmers with cutting-edge technologies and techniques.

# CHAPTER ONE : INTRODUCTION

## 1.1 Background of the study

Poultry farming stands out as a vital economic sector in , where agriculture is the main industry. However, optimizing feeding procedures is a major difficulty for local chicken producers, calling for creative solutions. By suggesting the creation and application of an Automatic Smart Poultry Feeder customized to the particular requirements of farmers in , this research seeks to address these issues.

The global significance of poultry farming is underscored by the exponential growth in poultry populations, serving as a vital source of protein worldwide (Tainika et al., 2019). The Food and Agriculture Organization (FAO) highlights the sustained rise in the global poultry industry, reflecting its essential role in meeting the increasing demand for poultry products.

Uganda, characterized by its predominantly urban landscape, relies heavily on poultry farming as a significant income source for households. However, farmers encounter formidable challenges in manually managing poultry feed, leading to issues such as inconsistent feeding schedules and overfeeding. These challenges not only impact the health and growth of poultry but also contribute to resource wastage and heightened production costs for the farmers.(Ogali, 2011)

The prevailing feeding methods in Uganda predominantly rely on manual labor and traditional techniques, proving time-consuming and susceptible to errors. This gap in automated feeding solutions for small-scale poultry farming presents an opportune avenue for the development of an Automatic Smart Poultry Feeder, specifically tailored to the local context.(Vincent, 2019) . The proposed Automatic Smart Poultry Feeder has the potential to revolutionize the local poultry industry, offering advantages such as precise feeding schedules, reduced feed wastage, and reduced feeding costs.

## 1.2 Problem Statement

In the agricultural landscape of Uganda, poultry farming stands as a vital economic activity, contributing significantly to the livelihoods of local communities. However, a pressing issue

## REFERENCES


Alders, R., Costa, R., Gallardo, R. A., Sparks, N., & Zhou, H. (2018). Smallholder poultry: Leveraging for sustainable food and nutrition security. *Encyclopedia of Food Security and Sustainability*, 340–346. https://doi.org/10.1016/B978-0-08-100596-5.21544-8

Astill, J., Dara, R., Fraser, E., Roberts, B., & Sharif, S. (2020). Smart poultry management: Smart sensors, big data, and the internet of things. *Computers and Electronics in Agriculture*, *170*, 105291. https://doi.org/10.1016/j.compag.2020.105291

Corkery, G., Ward, S., & Hemmingway, K. C. (2013). Incorporating Smart Sensing Technologies into the Poultry Industry. J. World"s Poult. Res. 3(4): 000-000.; In *Journal of World's Poultry Research J. World's Poult. Res* (Vol. 3).

Corkery, G., Ward, S., Kenny, C., & Hemmingway, P. (2013a). Incorporating Smart Sensing Technologies into the Poultry Industry. *J. World Poult. Res.*, *3*, 106–128.

Corkery, G., Ward, S., Kenny, C., & Hemmingway, P. (2013b). Incorporating Smart Sensing Technologies into the Poultry Industry. *J. World Poult. Res.*, *3*, 106–128.

Chinaeke-Ogbuka, I., Anoliefo, E. C., Ajibo, A., Ogbuka, C. U., Anoliefo, E., & Ogbuka, C. (n.d.). *Design and Implementation of an Automated Feeding System for Poultry Farms*. https://www.researchgate.net/publication/357780793

Murekatete, M. L., De Dieu, J., & Hakizimana, K. (2023). Contribution of Poultry Farming Products on Farmer's Socio-Economic Well-Being in Rwanda: A Case of Cooperative of Murambi Poultry Farming "COMUPOFA." *Journal of Entrepreneurship & Project Management*, *7*(3), 106–118. https://doi.org/10.53819/81018102T2143

Ojo, R. O., Ajayi, A. O., Owolabi, H. A., Oyedele, L. O., & Akanbi, L. A. (2022). Internet of Things and Machine Learning techniques in poultry health and welfare management: A systematic literature review. *Computers and Electronics in Agriculture*, *200*, 107266. https://doi.org/10.1016/J.COMPAG.2022.107266

Ogali, I. (2011). *International Network for Family Poultry Development Réseau International pour le*

*Développement de l'Aviculture Familiale Red Internacional Para El Desarrollo de la Avicultura Familiar PERFORMANCE AND CONSTRAINTS OF THE POULTRY PRODUCTION SYSTEM AMONG FFS FARMERS IN PEMBA ISLAND, TANZANIA*. http://www.fao.org/ag/againfo/themes/en/poultry/home.htmlwww.infpd.net

Olejnik, K., Popiela, E., & Opaliński, S. (2022). Emerging Precision Management Methods in Poultry Sector. In *Agriculture (Switzerland)* (Vol. 12, Issue 5). MDPI. https://doi.org/10.3390/agriculture12050718

Rejeb, A., Rejeb, K., Abdollahi, A., Al-Turjman, F., & Treiblmaier, H. (2022). The Interplay between the Internet of Things and agriculture: A bibliometric analysis and research agenda. In *Internet of Things (Netherlands)* (Vol. 19). Elsevier B.V. https://doi.org/10.1016/j.iot.2022.100580

Ribeiro, R., Casanova, D., Teixeira, M., Wirth, A., Gomes, H. M., Borges, A. P., & Enembreck, F. (2019). Generating action plans for poultry management using artificial neural networks. *Computers and Electronics in Agriculture*, *161*, 131–140. https://doi.org/10.1016/J.COMPAG.2018.02.017

Sarker, I. H. (2021). Machine Learning: Algorithms, Real-World Applications and Research Directions. *SN Computer Science*, *2*(3), 1–21. https://doi.org/10.1007/S42979-021-00592-X/FIGURES/11

Sharp, H., Rogers, Y., & Preece, J. (2015). Chapter 1: What is interaction design? *Interaction Design: Beyond Human-Computer Interaction*, 1–35. https://books.google.com/books/about/Interaction_Design.html?id=n0h9CAAAQBAJ

State, A. E., Birungi, P. B., & De Haan, N. (2009). *The role of poultry in peoples livelihoods in Uganda AUTHORS' DETAILS*.

Tainika, B., Şekeroğlu, A., Duman, M., & Şentürk, Y. (2019). *Poultry Production in Uganda: Challenges and Opportunities*.

United Nations. (2015). *Uganda Sustainable Development Knowledge Platform*. https://sustainabledevelopment.un.org/memberstates/uganda

Vincent. (2019). *POULTRY TRAINING MANUAL For Extension Workers In Uganda Theme:*

*Transforming Livelihoods through sustainable poultry production*.