POULTRY MANAGEMENT SYSTEM
CASE STUDY: JWF POULTRY FARM

By

WILSON MWESEZI

wmwesezi@gmail.com

+256704843331/+256775241320

DEPARTMENT OF COMPUTER STUDIES

FACULTY OF SCIENCE AND EDUCATION

NAGONGERA CAMPUS

BUSITEMA UNIVERSITY

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SUPERVISOR

DR. LUKYAMUZI ANDREW

DEPARTMENT OF COMPUTER STUDIES

FACULTY OF SCIENCE AND EDUCATION,

BUSITEMA UNIVERSITY

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DECLARATION

I WILSON MWESEZI Reg. No. BU/UG/2020/1917 do hereby declare that this Project Report is original and has been done by me.

Sign: 

Date: 20/01/2024

APPROVAL

This Project Report has been submitted with the approval of the following supervisor.

Signed:  Date: 23/Jan/24

Dr. LUKYAMUZI ANDREW

DEPARTMENT OF COMPUTER STUDIES

FACULTY OF SCIENCE AND EDUCATION

DEDICATION

Firstly, I thank the Almighty God who has successfully enabled me to complete my project with a sound mind and good health. I furthermore dedicate this report to my family who have stood by me in all circumstances whether good or bad.

I would like to extend special thanks to my supervisor Dr Lukyamuzi Andrew who has guided me throughout the course of my final year project and that has turned out to be a success.

Lastly I would like to thank everyone who has helped me throughout my course especially my only course mate Alice Norah Namazzi as she has been of great help and a positive influence to me reaching this point in my course.

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Lastly, I would like to thank all my fellow students whom we've studied with to reach this far especially those with whom we share many course units and classes as they have given me advice on how my final year project would run and any errors that would need to be addressed and have helped my life to run quite smoothly during my stay at Busitema University.

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ABSTRACT

The online poultry management system was designed to help small scale poultry farmers to be able to store their farm records in a place they could easily access them like their smartphone and as well be able to carry out their farm management with ease.

The online poultry management system was an android application that was developed to have a user who was the farm manager or owner who was able to store the various farm records as well as edit or delete such records or even retrieve the already existing ones with ease because access to one's smartphone is easier than using other gadgets like laptops, desktops.

The online poultry management system included various sections like the dashboard which provided quick access to the user so that they could access the various modules in the application without difficulty. It also included the eggs section where one could add a collection, and then increment it whenever they collected more eggs and could as well view the total eggs collected on that particular day. It also included the sales activity or page where you could view the sales for a particular day and also add new ones that had been made. It also showed the total sales for that particular day. It also included a purchases or expenses activity or page that showed all the purchases and as well allowed the user to add a new purchase once it had been made. It also included a feeding activity or page which contains records on the house to be fed, the time of feeding, the type of feed to be given to that particular house as well as the quantity of feeds to be given to that particular house. It also allowed the user to add a new feeding record containing the above and as well was able to search for a particular house once required. It also included a health activity or page where you could view the vaccination date, vaccines to be administered as well as the disease to be treated and the user could also be able to add a new record in the same activity. It also included various reports such as eggs report, purchase report, sales report provided to the user at any time.

The system was developed using Rapid Application Development (RAD). It was developed using android studio which uses Intellij IDEA as its Integrated Development Environment. The language used for developing was java in association with XML all available in android studio. XML handles how the different activities/pages would appear then java now connects the different activities as well as carry out various operations in the system including calculations, database connections to mention but a few. The application is online and the data from the various users is stored in google Firebase which is under Google Cloud.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF STUDY

Poultry are domesticated avian species that can be raised for eggs, meat and/or feathers. The term “poultry” covers a wide range of birds, from indigenous and commercial breeds of chickens to Muscovy ducks, mallard ducks, turkeys, guinea fowl, geese, quail, pigeons, ostriches and pheasants. These birds are raised for meat, eggs, feathers, manure and some are even kept as pets at home.

Many people all over the world keep poultry birds for various reasons but many of these who keep them for purposes of income from selling the poultry products usually do not keep farm records for the farms and deem record keeping irrelevant to their farms (Dudafa 2013) .

In the beginning, farmers never used to keep farm records, especially in Africa where farming was the major economic activity. Farmers used to use poultry in various avenues such as paying bride price, cultural rituals to mention but a few. So such farmers never even thought of keeping farm records because some of them never knew how to reads and write. So this caused these farmers to keep up with their agricultural practices and farming but without keeping any record of their farming practices. Some farmers used to keep their farm records in their heads (Das, Sahu et al. 1997) but these could easily be forgotten.

In the 20th century, many farmers adopted farm record keeping (Murdoch and Ward 1997) but such farmers used to keep their farm data and information mainly on paper or books or on hard copies and as technologies evolved farmers kept on adopting such technologies of which these included use of computers in the day-to-day operations of their farms to store farm data rather than storing it on paper or in hard copy.

Today farm management systems are being used all over the world by various and different farmers and individuals for better and easier management of their farms but most of these farming systems are often time used by farmers that have large number of poultry birds so those with smaller number or quantity of poultry birds often time don’t take the time to use or effect such poultry management systems in their respective farms.

This research was on developing IT solution to effectively manage poultry business. The research is based on JWF Poultry Farm. This poultry farm is located in Ndejje-Lufuka in Makyindye-Sabagabo Sub-county in Wakiso District. It is a small scale poultry farm that deals

in egg production and on this farm only layers or birds that lay eggs are kept therefore implying that its major aim is to produce eggs.

1.2 PROBLEM STATEMENT

Many poultry farmers around the country and around the world usually do not keep farm records because of the small amount of birds that are kept at these farms so there is lack of record keeping among these poultry farmers since they think that the birds they have are too small to effect economies of scale (Ibrahim, Adisa et al. 2018).

In most poultry farms little or no record keeping is done. At JWF Poultry Farm, records are kept on paper and in books and these records cannot be easily referred to at any time and these records are also very easily lost or misplaced or even tampered with by external personnel that may visit the poultry farm or external factors like rain that cannot be stopped but may affect the or destroy the farm records.

So to counter such challenges and problems, I intend to develop a poultry management system that these small scale farmers like JWF Poultry Farm will use to keep their farm records on the daily transactions on their farms but also make the management of the poultry farm much easier than it has been. This system will be an android application because due to the growth of technology in the world. Research has shown that over the last ten years, smartphone usage has increased in the world (Busch, Hausvik et al. 2021). So due to the increased usage, it will now make it easier for these poultry farmers to be able to store their farm data on their smartphones because many of them can access their smartphones with ease.

1.3 OBJECTIVES

1.3.1 MAIN OBJECTIVE

The main objective of this study is to develop an online poultry management system that will be used to store and efficiently and effectively manage poultry farms in various avenues that include managing and storing egg production records, transaction records as well as general poultry management records.

1.3.2 SPECIFIC OBJECTIVES

1. To determine the requirements of the online poultry management system.
2. To design the online poultry management system.
3. To implement the online poultry management system.
4. To test and validate the online poultry management system.

1.4 SIGNIFICANCE OF THE STUDY

This project will enable the poultry farmers to be able to store their farm records within their reach since it becomes hard to remember records that are kept in their heads so they will be able to manage their farms easily and efficiently using their smartphones without fear of losing their data and information since it is kept in the cloud.

The project will be able to cater for multiple similar instances and circumstances for example it could be modified to cater for other birds or poultry rather than chicken only so it could cater for turkeys, ducks to mention but a few. It could also be modified to cater for other animals like cattle so as to be able to collectively manage farm records effectively and diversely.

The project will also allow future researchers to be able to modify and be able to come up with an even better way to effectively and efficiently store farm records with ease so that farmers make it a habit to store their farm records even without need to be reminded.

1.5 SCOPE OF THE STUDY

1.5.1 AREA SCOPE

The study was carried out from JWF Poultry Farm that is located in Ndejje-Lufuka in Makyindye-Sabagabo sub-county in Wakiso district and the farm is located along Ndejje-Kibutika road.

1.5.2 CONTENT SCOPE

The system provided a single security mechanism where the users will have to sign up and create accounts.

Every user was able to manage their own account and each account was tied to strictly one farm. All the data for that farm was entered and managed by the farm owner. Deletions, additions and updates were done by the farm owner or manager.

Records on egg collection, sales, purchases, feeding, health and vaccinations as well as information on poultry houses were also stored in the application. Reports on sales, purchases/expenses, general transactions as well as eggs collected in various timeframes were produced by the application and the user could be able to download them and see them offline.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explains the working of the system and goes ahead to describe the kind of system I intend to come up with, under what category of systems it falls, the main aim of the system to mention but a few. It also describes the basis of the system and what was considered in the process of coming up or of developing the system. This chapter also gives a clear description of an online poultry management system and its functionalities.

Currently, most small scale poultry farmers do not keep poultry farming records (Ibrahim, Adisa et al. 2018) because they believe that their farms or the birds they keep are too small to effect the economies of scale. So they end up earning money from their poultry products year after year but they can never tell the quantity of the products that they were able to sell as well as the amount of money that they spent in the name of poultry so this system is intended to make their work of record keeping easier so that they can be able to tell their expenses, earnings, losses, profits by referring to their system.

2.2 POULTRY

Poultry refers to domesticated birds kept for eggs or meat (Merriam-Webster. (n.d.)). These domesticated birds can be kept for commercial or commercial purposes. The term "poultry" covers a wide range of birds, from indigenous and commercial breeds of chickens to Muscovy ducks, mallard ducks, turkeys, guinea fowl, geese, quail, pigeons, ostriches and pheasants. These birds are raised for meat, eggs, feathers, manure and some are even kept as pets at home. Poultry production has grown and will continue to grow due to an increase in demand for both eggs and poultry meat (Barua and Yoshimura 1997).

2.3 INFORMATION SYSTEMS

A system is a group of interacting or interrelated elements that act according to a set of rules to form a unified whole. There are various types of systems such as information systems, executive systems, expert systems to mention but a few. The system I intend to come up with is an information system.

An information system is an interconnected set of components used to collect, store, process and transmit data and digital information. It involves a combination of software, hardware, and telecommunication networks to collect useful data, especially in an organisation. Many businesses use information technology to complete and manage their operations, interact with

their consumers, and stay ahead of their competition. Some companies today are completely built on information technology, like eBay, Amazon, Alibaba, and Google.

Information systems are further divided into more sub-systems which include operations Support systems, Management Information systems, Decision Support systems as well as Executive Information Systems and among all these I intend to build or develop a Management Information System since its main aim is to aid the managers of the poultry farms to be able to store and retrieve poultry farm records with ease.

2.4 MANAGEMENT INFORMATION SYSTEMS

A management information system is an information system used for decision-making, and for the coordination, control, analysis and visualization of information in an organization. It involves the study of how people use technology to manage information that they are availed with.

Planning and decision making have rightly been called the primary management tasks and these tasks occur at every level of management (Adeoti-Adekeye 1997). The main purpose of MIS is reporting and it provides the necessary information to the managers and supervisors at various levels to help them to discharge their functions of organising, planning, control and decision making.

The information from my system will be used by the poultry farmers to be able to coordinate, analyse and as well visualise the information in the system and thereafter be able to take the appropriate measures.

2.5 POULTRY MANAGEMENT SYSTEM

Poultry management usually refers to the husbandry practices or production techniques that help to maximize the efficiency of production. There are four main poultry management namely free Range poultry Management, Semi-intensive poultry Management, Folding Unit poultry Management, Intensive Poultry management (PoultryCare 2021).

Some of the important poultry management practices include; brooding management which is critical for chicks especially before and after they arrive in the brooder, water management which determines how much water the birds require, litter management, feeding management, lighting management to mention but a few (Mania 2018-2021).

A poultry farm management system is a database-based software system that can record needed or relevant documents about a poultry farm. This poultry management system stores the farm

data and information in a central database that can be accessed and this information can be retrieved at any time by the farm managers.

Database use is increasing in the world as databases are increasingly becoming popular as they are becoming more connectable and manageable with the current systems (Cambra Baseca, Sendra et al. 2019). Since these databases are becoming more popular, they have made the storage and retrieval of the farm data way more easily than it used to be.

2.6 REVIEW OF PREVIOUS POULTRY MANAGEMENT SYSTEMS

Poultry involves the rearing of birds domestically. So since they are kept for domestic reasons, various people keep these poultry birds for various reasons and due to the various reasons the flock size or number of birds people keep also differs (Guèye 2003) so various methods have been put across to manage poultry farms over time. Some of these have proved to be efficient while others have not achieved the goal they were meant to achieve.

Different countries have their own methods of keeping poultry farm records basing on the requirements of their country of residence. For example, in the United Kingdom, there is a law known as the Avian Influenza (Preventive Measures) (England) Regulations 2006 require any person who keeps 50 or more birds to keep or submit certain records to the department of Environment, Food and Rural Affairs (DEFRA) such as address of premises and holding number (if it has one), keeper's name and address and, if different, that of the owner of the poultry and the occupier of the premises, species kept, type of husbandry system (meat, eggs or hatching eggs), incubator capacity of any hatchery, number of each species usually kept, number of species with access to open air to mention but a few (Institute 2022). This will thus require the poultry farmer to keep the farm records as they are required by law to submit them to the authority in charge.

In Uganda, on farms like Biyinzika Poultry Farm International Limited, in the past records were still kept on paper earlier on and such a poultry farm faced similar problems and issues that come with using that kind of record keeping. A drive was made and a poultry management system was developed for the poultry farm and had sections like sales management, purchase management as well as product management (Kagona 2021).

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methods that shall be used to achieve the objectives of the study. It describes how data was collected using literature review, interviews, observation, focus groups and how collected data will be analysed to aid the development of the system.

The method that was chosen for this project is qualitative in nature. This is because it is very efficient and it produces rich, detailed and valid process data based on the participant's, rather than the investigator's, perspectives and interpretations. I also chose qualitative method of research because it can be used to obtain information if the researcher is interviewing a small or limited number of people in his/her research. Qualitative methods are often time used for conducting researches that rely on open ended exploration of people's actions, words, thoughts and intentions. Qualitative methods include observation, focus groups as well as interview.

3.2 AREA OF STUDY

The study will be carried out from JWF Poultry Farm that is located in Ndejje-Lufuka in Makyindye-Sabagabo sub-county in Wakiso district and the farm is located along Ndejje-Kibutika road. JWF Poultry Farm was chosen for this study because of the problems that were observed at the farm in the different and various activities on the farm. The study will cover all the relevant parts of a poultry farm that include chicken feeding, expenses, egg sales, egg reports, expense reports to mention but a few.

3.3 POPULATION AND SAMPLING

A population is a complete set of people with a specialized set of characteristics, and a sample is a subset of the population. It is a well-defined collection of individuals or objects known to have similar characteristics. The purpose of the study determines how many people will be involved in the research and sampling and it also determines the other factors that will be considered when performing the study.

In this study, only one person was interviewed. This person is a female and she is the manager of JWF Poultry Farm. This person was the only person at the farm and was thus the one who provided the various information that I required or that I needed to know about the farm.

3.4 DATA COLLECTION TECHNIQUES

This explains the various methods that I used to obtain information by the researcher who happened to be me. I used a number of methods and steps so as to be able to obtain and collect

information that I was going to use all through till the end of this project. Some of the methods include the following:

3.4.1 INTERVIEW

The interview technique is the most common method of collecting data while carrying out research (Taylor 2005). It involves the researcher meeting face to face with the people that he intends to give him information. Interview technique is credited in the following ways; it allows an interviewer to follow up an interesting comment made by interviewee, it also allows the interviewer to adopt or re-ward questions during interview, it allows interviewer to observe interviewee's bodily language, interviewee can also respond freely and openly to questions. However, it has drawbacks such as very time consuming and costly for example since I had to meet her face to face I had to leave Tororo to go to Wakiso to be able to carry out this method, and therefore maybe impractical, Success is dependent on communication skills of interviewee. I used this technique to ask questions from the manager of JWF Poultry Farm various questions ranging from how she feeds the poultry birds, how many times, the type of feed and how much of that feed. I was able to also obtain information on how she stores her information and how she handles her books of accounts and all the relevant information that I could use when developing my application.

3.4.2 OBSERVATION

Observation is an act of recognizing and noting a fact or occurrence often involving measurement with instruments (Merriam-Webster. (n.d.)). It is a way to gather data by watching people, events, or noting physical characteristics in their natural setting. Observations can be of two types; overt where the individuals being observed know that they are being observed and covert where one observes individuals without them knowing that they are being observed. Observation is one of the most common methods used to gather information. I was able to use this method of gathering information at JWF and I was able to find out how operations take place at the farm. I was able to find out the times that they feed the birds, the number of times they collect eggs to mention but a few and all this information was gathered during my observation at the JWF Poultry Farm. However, I faced various challenges during my observation such as I was not able to know everything that I needed to know from the farm and so I had to use another method in addition such as interview so as to be able to obtain more information that I needed.

3.4.3 DOCUMENT REVIEW

Document review is a method of collecting and gathering information which involves reviewing the existing documents. Document review can be used alongside other methods of data collection and can even at times be used alone as the sole source of information during the research (Cabral 2017). I used this method during my information gathering where I went to JWF Poultry Farm and requested for their records and documents of their operations. I was availed with their documents including their books of accounts showing the purchases, sales. I was also availed with the eggs records as these would be important to my research. This method is very reliable because it avails the researcher with the information he needs to do his research but however it also has some limitations. These include the fact that some documents may not include useful information that is required for the research, and that some documents may be incomplete and this provides incomplete and biased information to the researcher.

3.5 SYSTEM DESIGN

This describes how the functions of the patient records management information system could be realized. This shall be done through the use of system design tools such as DFDs, Context diagrams, Entity Relationship Diagrams (ERDs), Use case Diagram that could be used in the development of the system and it is databases.

The system is intended to use a Model View Presenter Architecture to be able to handle requests and be able to present the data to the user. Here in the MVP Architecture, the model is the data layer and it stores the data for the application. The view is the user interface that the user will see and use to input data into the application or even be able to get output from the application. The Presenter presents data from the model to the view and any data that is input at the view is also presented or input into the database or model. The Model View Presenter Architecture is good because it separates the model from the view and connects them using the presenter and this makes testing of the various system components easy.

3.5.1 RAPID APPLICATION DEVELOPMENT

Rapid application development is an agile software development approach that focuses more on ongoing software projects and user feedback and less on following a strict plan. As such, it emphasizes rapid prototyping over costly planning.

The researcher used Rapid Application Development because it was fast, less costly and also left the developer satisfied with his own work.

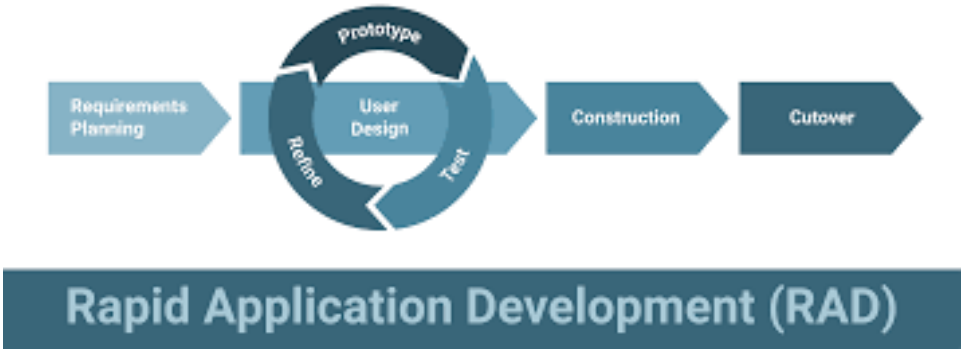

Figure 1: Rapid Application Development

3.5.2 CONTEXT DIAGRAM

A context diagram is one that outlines how external entities interact with an internal software system. Its primary use is to help businesses/developers define the borders/ scope of their system and as a result, they can figure out how best to design the new system and its requirements or how to improve the existing system.

3.5.3 DATA FLOW DIAGRAM

Data flow diagram shows how data moves or changes through a specified sequence as shown below in the graphical top-down fashion that describes the system components, processes and interfaces. It helps to examine the inputs, outputs and processes of the patient records management information system.

3.5.4 USE CASE DIAGRAM

The Use case diagram represents the activities of the users with special functionalities of the system. Use case diagram model is what the system is expected to do and to view externally the use of the system from the user's perspective rather than internally.

The use case module partitions the system's behavior into transactions so that each of the transactions performs some practical action. All these are accomplished from the user's view.

3.5.5 ENTITY RELATIONSHIP DIAGRAM

The Entity Relationships Diagram is a graphical representation of the relationship between the entities and attributes within a proposed database of the system. The entities about the data includes staff, patient, departments, prescription, patient medical history, admission and wards.

3.6 SYSTEM IMPLEMENTATION TOOLS

The system designed is an online android application that will be installed on the farmers' phones or android devices. The data for the various farms will be stored in the Firebase database

which is a part of Google Cloud. So in other words, the farm data is to be stored in Google cloud and will be accessed via an internet connection.

To implement the system, Java programming language is to be used and this will be in collaboration with android studio which is a platform that can be used to create android application in Java or Kotlin. Android studio uses Intellij IDEA as its editor and comes with an inbuilt compiler. The data for the application will be stored in a Firebase database which is under Google Cloud. The database is accessed over the internet and all insertions and deletions and updates are made online. The Firebase database is not an SQL database, it is in form of a JSON tree where one child is a child to another. Firebase can be able to store data of various data types such as String, Boolean, integer, float to mention but a few.

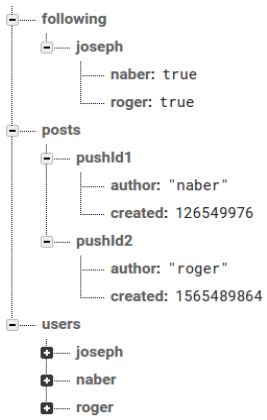

Figure 2: Format of a Firebase Database

3.8 TESTING AND VALIDATION

System testing refers to the evaluation of how the various components of an application interact together in the full, integrated system or application. System testing verifies that an application performs tasks as designed.

Both unit and integration testing were done and carried out on the system after implementation. This was done to find the errors and bugs in the system and there after validate and ensure that the system does what exactly it is supposed to do.

Unit testing was carried out on the various units and modules of the system. This was to ensure that each module or unit of the system was performing the functional requirement that it was meant to perform.

Integration system was also carried out to find out how the various units of the system interacted with each other. This was to ensure that when all the system components and units were put together that they would perform the functional requirements that they were supposed to.

Validation involves testing the system against the user requirements. So after developing the system, I was able to test the whole system to make sure that what the poultry farmer needed is exactly what the researcher implemented in the poultry management system,

CHAPTER 4: SYSTEM ANALYSIS AND DESIGN

4.1 INTRODUCTION

This chapter describes the study of the current system, strength of the current system, weaknesses of the current system, system requirements (functional and non-functional requirements), system design (system architecture, context diagram Data Flow Diagram, ERD, User Case Diagram).

4.2 CURRENT SYSTEM STUDY

The current system that is being used to store data and information at JWF poultry farm is a manual file based system. This system involves storing the farm records in various books from which this information could be retrieved once it is needed.

To store the daily number of eggs collected, the farm manager has a paper on which the daily collections are added. at the first collection, a new row is starts and the date is written at the beginning for that specific day. Then at every time of collection, eggs are added to those that were previously picked depending on the poultry house from which they were picked till the last collection of the day. The eggs at the end of the day are then totaled up so as to obtain the figure or the total number of eggs collected on that specific day. The total number of eggs collected for each day is then recorded in another counter book where it is stored besides the date of collection and if needed this book is checked for such records.

To store the number of eggs sold and amount, there is a book that is specifically for eggs sold so all the eggs sold are stored in such a book including the price per tray of eggs at which the eggs were sold and the total amount of eggs sold. If the eggs were sold on credit and the customer paid part or nothing on the eggs they have taken, it is also recorded in the same book that a certain customer has taken this number of eggs and has paid this much and has this amount not paid. At any time if the customer pays, it is also recorded that the customer has paid the balance that was being demanded from them.

Any expenses or purchases made at the farm be it for the chicken feeds, timber, nails, water bills, electricity bills, coffee husks are also recorded in another book. Such a book is where the receipts of the purchases as well as the invoices are stored and if needed are retrieved from that book.

The expenses are then balanced up and the sales the same thing so that a total profit or loss is calculated. The total profit is then known and the total money collected or accumulated is then

counted so that a figure is obtained to know how much do we have or how much we are in debt while balancing these books of accounts.

4.3 STRENGTH OF CURRENT SYSTEM

The current system of storing and retrieving farm records is a manual file based method of keeping records. It has some strengths or some things u can gain while using it. These are as follows;

Simplicity. The current system at JWF poultry farm is simple to use for example when you pick eggs you just add the eggs to the previous ones that were collected earlier on the piece of paper and then add them up to get the total number of eggs collected at the end of the day.

The current system being used at JWF poultry farm is cheap since it is a file based so this makes it more affordable since when the manager buys a book to store the records, this book can be used for quite a long time without needing to buy a new one.

No Dependency on Technology: The manual system being used at JWF poultry farm does not rely on computers, internet connectivity, or electricity, making it more resilient and usable especially in situation when there are power outages.

The current system uses paper based records which are easy to access physically so at any time if the manager ever needed to access the records in those books, then he/she would just get to the books and use them.

Tangible Records: JWF poultry farm uses manual records which provide tangible copies that can be physically reviewed, signed, and stored securely. This is important for compliance and regulatory purposes.

Familiarity: Many farmers and agricultural workers are more familiar with traditional pen-and-paper methods, making it easier for them to adapt to and maintain a manual record-keeping system and this is the same case with JWF poultry farm.

Privacy and Security. The current system uses manual records that can be kept in a secure and private location, reducing the risk of unauthorized access or cyber-attacks.

The current system being used at JWF is personalised so if the managers wish to add a new component to their farm’s books, then they can easily do it.

4.4 WEAKNESS OF CURRENT SYSTEM

Despite the large number of strengths and good things that are associated with the current system being used by JWF poultry farm it still has many and multiple weakness. These include the following:

Prone to Errors: the current system being used at JWF poultry farm is more susceptible to human errors, such as illegible handwriting, data entry mistakes, and calculation errors. These errors can therefore lead to inaccurate data, which may impact on decision-making and analysis.

Time-Consuming: Maintaining manual records can be time-consuming for example when you collect eggs, then you write on paper, then the paper is totaled at the end of the day then the total is stored in another book and if there is need to update a record then it may be a little more time consuming to find that record

Difficult Data Analysis: Analyzing and interpreting data from the manual records as used in the current system at JWF Poultry Farm can be challenging and time-consuming. Generating reports or conducting trend analysis may require manual calculations and data extraction.

Limited Accessibility: Manual records are physically stored in files, making them less accessible to multiple users simultaneously. Sharing data between different farm personnel or stakeholders can be cumbersome. Since there is one book at a time if the manager wanted to look at it and the customer as well then both can’t access it at the same time.

Space and Storage: Manual records can accumulate and require significant physical storage space, which can become a challenge when dealing with extensive historical data.

Lack of Data Backups: The manual records or books do not have automatic data backup mechanisms, making them vulnerable to loss or damage due to accidents, fire, or other unforeseen events.

Limited Data Security: Physical files are more susceptible to loss, theft, or unauthorized access compared to digital records that can be protected using encryption and access controls.

Difficult Reporting: Creating detailed and comprehensive reports from manual records may require substantial effort and may not be as dynamic and customizable as digital reporting systems.

Limited Data Sharing: Sharing manual records with external stakeholders, such as auditors, consultants, or government agencies, suppliers, customers may involve making copies or physically transporting the files.

Lack of Integration: The current system may not be easily integrated with other farm management tools or software, limiting the efficiency of overall farm management processes.

Inconsistent Data Format: the current system of manual record keeping may lack standardization and consistency in data format, making it challenging to perform comprehensive data analysis.

4.5 SYSTEM REQUIREMENTS

The system that I intend to develop or come up will typically have one user. Since the application was originally intended for small scale farmers where the farm owner is often time the sole financer and manager of the farm activities.

The single user will be able to sign up after downloading the application, then after will be able to login and then be able to add farm data and information as they wish be it whether it is information on eggs collected, houses from which they were collected, eggs reports, sales reports, add expenses and view expense reports, feeding. All these actions will be available for the user since the user s assumed to be the manager of their own farm.

4.5.1 FUNCTIONAL SYSTEM REQUIREMENTS

The functional requirements describe the functionalities or services that the system is going to render to its end users. These system requirements include the following;

The system was able to store or capture information on the eggs collected in a day.

The also had the capabilities of allowing a user to add eggs in case a collection or eggs are picked so the user would be able to add to that specific house.

The system then displayed the total of eggs collected but of that very day. The total is specific to the current day

The system would be able to store data on the poultry houses at the poultry farm by name depending on how the user wishes to name the poultry houses at his farm. It would also allow the user to add or delete a poultry house.

The system would be able to add feeds to a poultry house in kilograms and also the time at which these feeds were to be given to the birds and which type of feed was to be given.

The system was able to store sales on the farm and these included the number of trays sold, the unit price/ price per tray and then the total sales made for that day.

The system was also able to record expenses/purchases made by the farm and would also be able to display them for the user to view.

The system was able to allow the user to add a disease to the application and when it would be vaccinated or when medicine would be administered. The system was also able to show the diseases in the system and when they were to be vaccinated.

The system was also able to show in-app reports for the user such that the user can view the reports from within the application including egg reports, sales reports as well as expense reports.

4.5.2 NON-FUNCTIONAL SYSTEM REQUIREMENTS

The non-functional requirements are not directly concerned with the specific functions rendered by the system, but increases on the accuracy, reliability, performance of the system. The non-functional system requirements include the following;

User friendly: the system is user friendly and uses familiar icons and features that users can easily be able to use.

Zero-Data Loss. The application uses Firebase database which is under google cloud so the data stored in the firebase database will not be lost because there are already measures that were put in place to store data that is stored in google cloud.

Little data usage. Since the application is an online application and data is stored in firebase database, there will be a need to use mobile data or internet connectivity but this app's data is very minimal thus the little data usage requirement.

4.6 HARDWARE/ SOFTWARE REQUIREMENTS

4.6.1 HARDWARE REQUIREMENTS

The hardware requirements include the following;

i. A universal hard disk of at least 100GB
ii. Random Access Memory (RAM) of at least 8GB
iii. Uninterruptible Power Supply

4.6.2 SOFTWARE REQUIREMENTS

The software requirements include the following;

i. Android Studio
ii. Windows 10 or higher
iii. Internet browser

4.7 SYSTEM DESIGN

System design is the process of defining the architecture, interfaces, and modules for the system to realize functionality of the requirements. This was through the use of system design tools such as system architecture, context diagram, Data Flow Diagram, Entity Relationship Diagram and User Case modelling diagram to help to know how different processes interact with each other and their relationships.

4.7.1 SYSTEM ARCHITECTURE

The system used the Model-View presenter (MVP) Architecture. The system was an android application that had a view that we could all view and see in the application as the user interface, then it had the model which stored the data and this was implemented using the firebase database. Lastly it contained a presentation layer that acted like a man in the middle and was able to process the various events and user requests in the system.

The poultry management system is an online android application that enables the users to access the firebase database via their internet connection. Every user was able to create their own account and thus had different emails and passwords.

These users when they thereafter logged in, a new node in the firebase database was created for that new user and all the data for that person's farm was to be stored under that node. This made it easy to store the farm data for the specific farms without fear that the farm data would be mixed between various farms. Under each farm node the data was to be added, updated or retrieved by the user of the application who is the farm owner or manager. The farm manager or owner therefore reserved the right to change or to access the farm data of his /her farm as long as they do not share their credentials with other personnel.

4.7.2 SYSTEM CONTEXT DIAGRAM

This is the highest level of data flow diagram that defines the scope of the system and provides an "outward" looking view from the system, shows system boundaries and interaction with external entities. The context diagram also shows other subsystems or group of people that interact with the system and the main flows of data. It has data flows and processes as shown below;

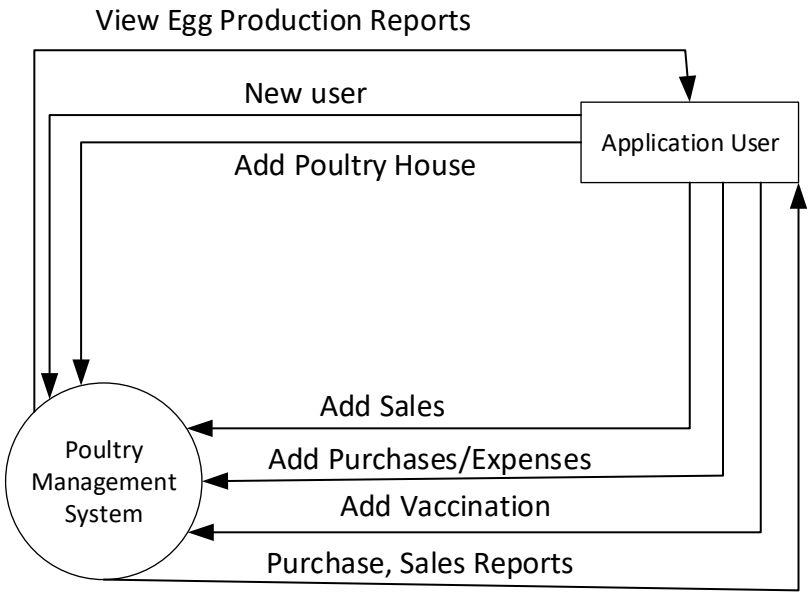

Figure 3:System Context Diagram

4.7.3 SYSTEM DATA FLOW DIAGRAM

Data flow diagram shows how data moves or changes through a specified sequence as shown below in the graphical top-down fashion that describes the system components, processes and interfaces. It helps to examine the inputs, outputs and processes of the patient records management information system.

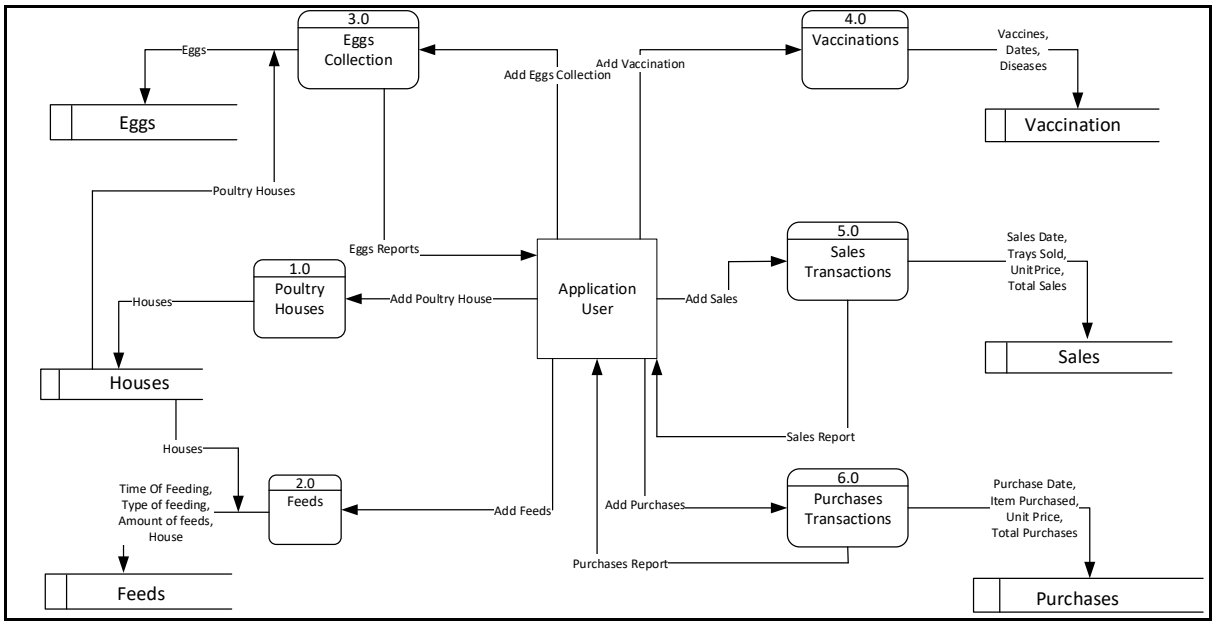

Figure 4:System Data Flow Diagram

4.7.4 USE CASE DIAGRAM

The Use case diagram represents the activities of the users with special functionalities of the system. Use case diagram model is what the system is expected to do and to view externally the use of the system from the user's perspective rather than internally.

The use case module partitions the system's behaviour into transactions so that each of the transactions performs some practical action. All these are accomplished from the user's view.

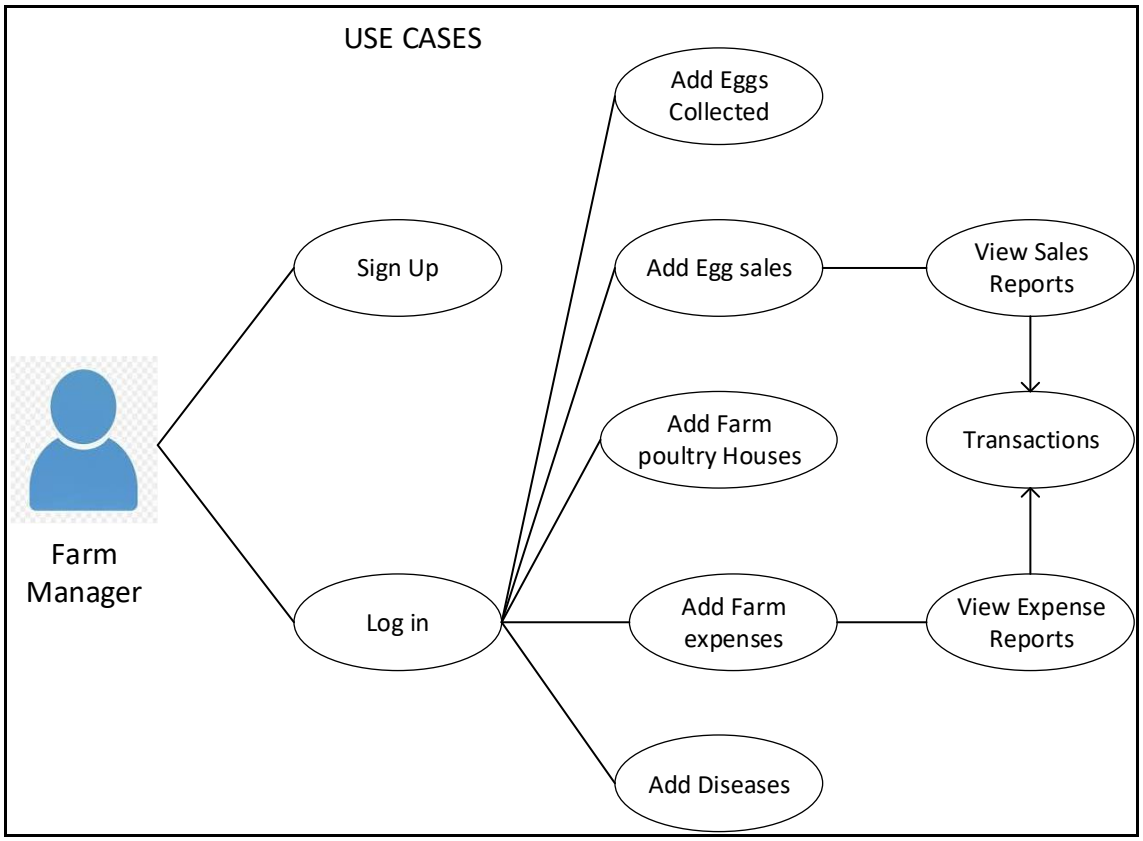

Figure 5: Use Case Diagram

4.7.5 SYSTEM ENTITY RELATIONSHIP DIAGRAM

The Entity Relationships Diagram is a graphical representation of the relationship between the entities and attributes within a proposed database of the system. The entities about the data includes staff, patient, departments, prescription, patient medical history, admission and wards.

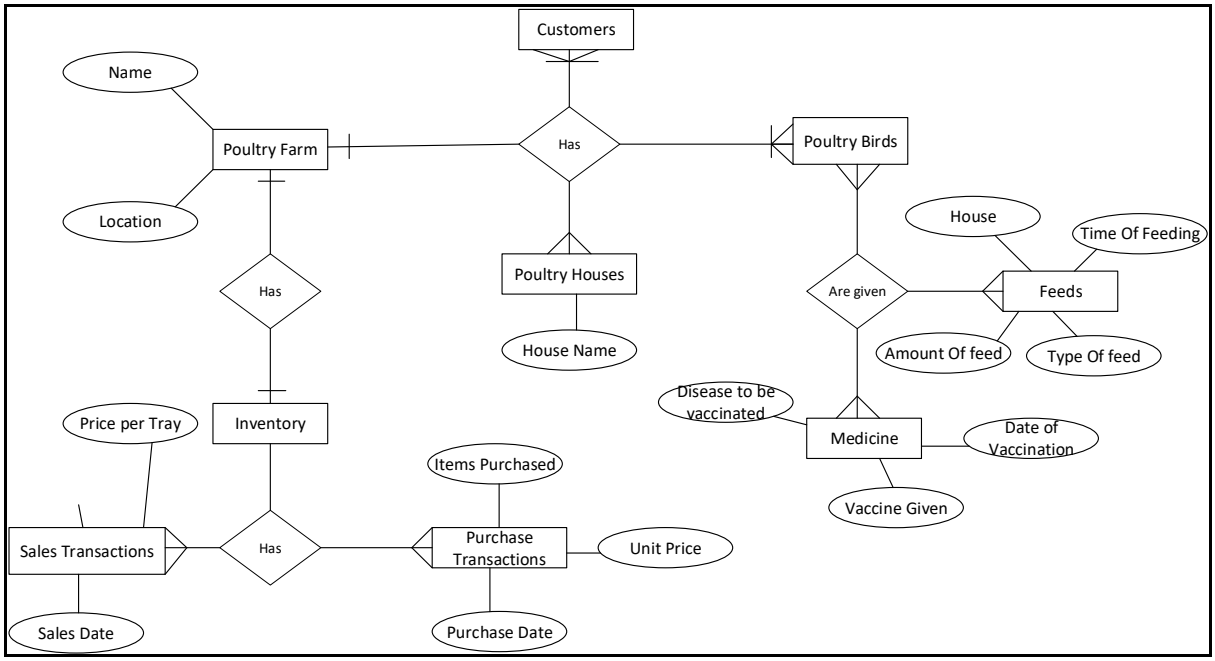

Figure 6:Entity Relationship Diagram

4.7.6 DATABASE DIAGRAM

Database design refers to the steps required to create, implement, and maintain a business's data management systems. The primary purpose of designing a database is to produce physical and logical models of designs for the proposed database system.

Database diagram graphically shows the structure of the database and relations between database objects.

4.8 USER INTERFACE DESIGN

The interface for the login page was designed to appear as follows;

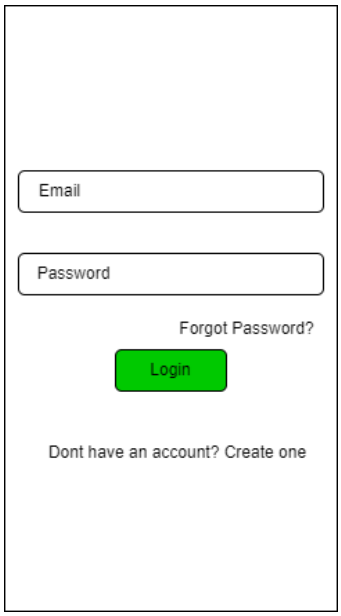

Figure 7: Login User interface

The system has a dashboard to show the quick access parts and functionalities of the system.

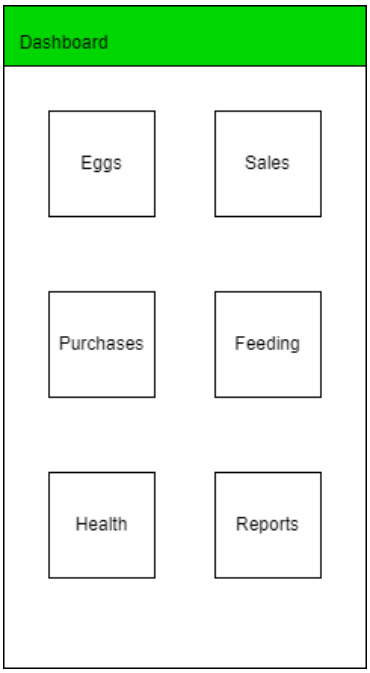

Figure 8: Dashboard User Interface

The reports dashboard where one can easily access the reports for the various modules and it was designed to appear as follows.

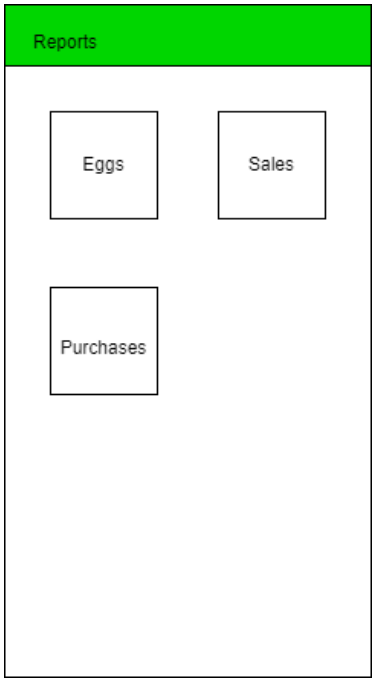

Figure 9: Reports User Interface

CHAPTER 5: IMPLEMENTATION AND TESTING

5.1 INTRODUCTION

This chapter is aimed at implementing or putting the functional and non-functional requirements that were mentioned earlier into place. It furthermore involves testing the developed system or application to see if it meets the requirements of the users as well as the objectives that it set out to achieve.

5.2 USER INTERFACE

To the user, the interface is the system. So no matter what happens the user interface in the system is key, so if the user interface is not good or does not look good then the users will find it hard and difficult to use. The user interface mainly focusses on how the application or the system will appear or look like at first site by the user and the user interface also determines if the system will be usable by the intended users or not since systems are developed to make people's lives easier so if the user interface is not user-friendly then it is going to give the users hard time to use. The functional and non-functional requirements that were set earlier on were implemented and they include the following;

The user/farm manager will be able to sign up and create an account with the application.

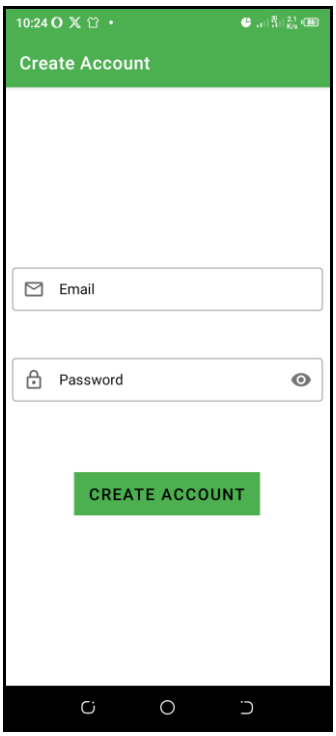

Figure 10: Create Account Activity/Page

Once they have created an account they can now login using the following interface.

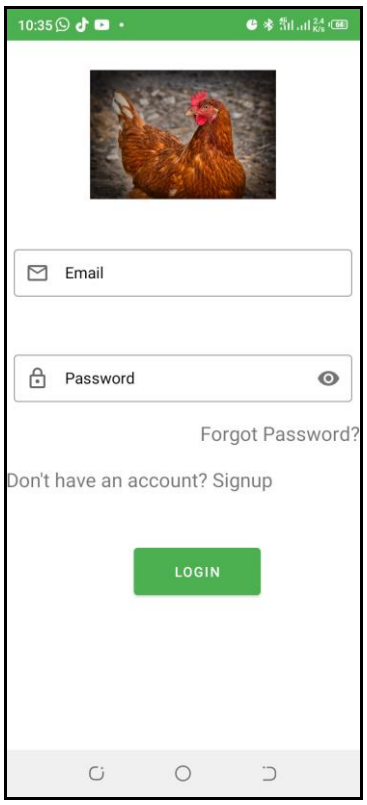

Figure 11: Login Page

The system has a dashboard to show the quick access parts and functionalities of the system.

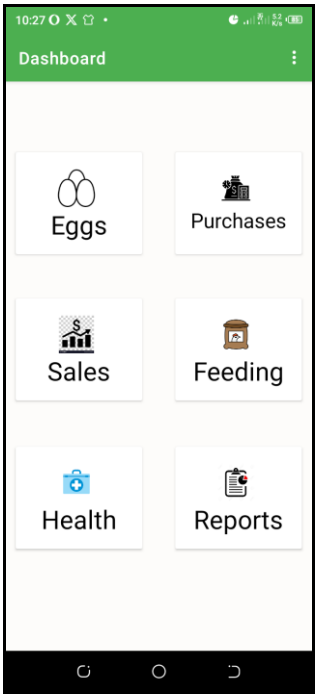

Figure 12: Dashboard Activity

The system is able to store or capture information on the eggs collected in a day and also has the capabilities of allowing a user to add eggs in case a collection or eggs are picked so the user will be able to add to that specific house. The system then displays the total of eggs collected but of that very day. The total is specific to the current day.

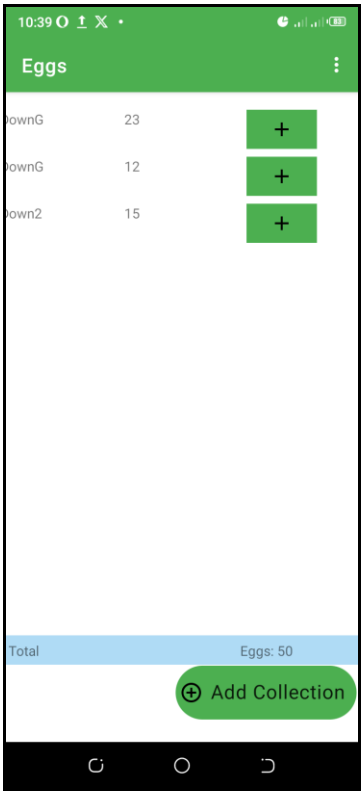

Figure 13:Eggs Activity

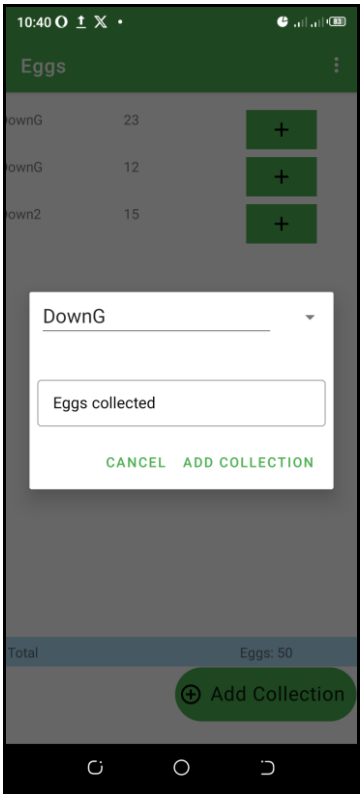

Figure 14:Add Collection Activity

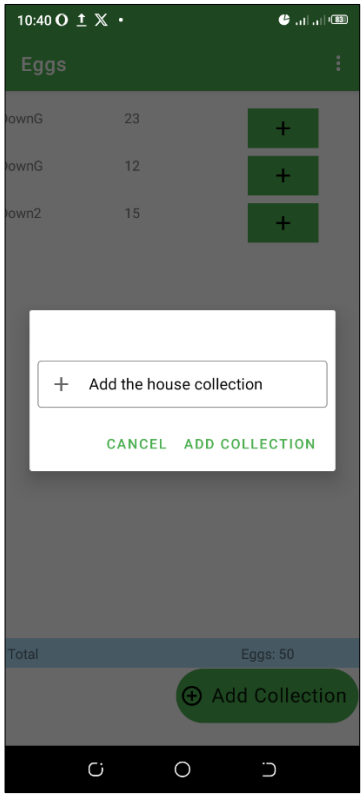

Figure 15:Update Egg Collection

The system is able to store data on the poultry houses at the poultry farm by name depending on how the user wishes to name the poultry houses at his farm. It will allow the user to add or delete a poultry house.

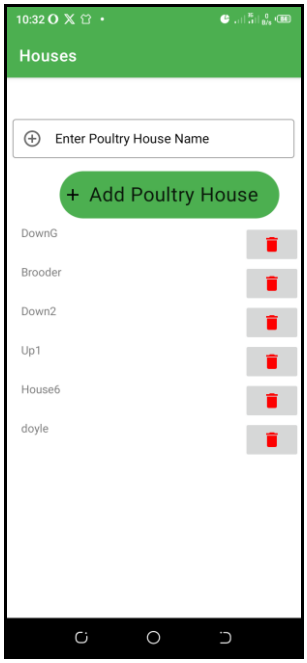

Figure 16: Add/ Delete Poultry House

The system is able to add feeds to a poultry house in kilograms and also the time at which these feeds are to be given to the birds and which type of feed is to be given.

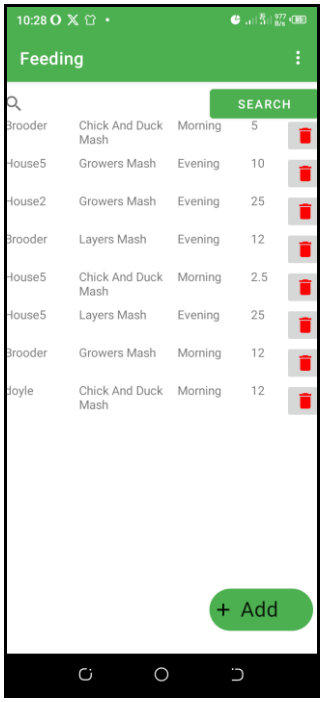

Figure 17:Feeding Activity

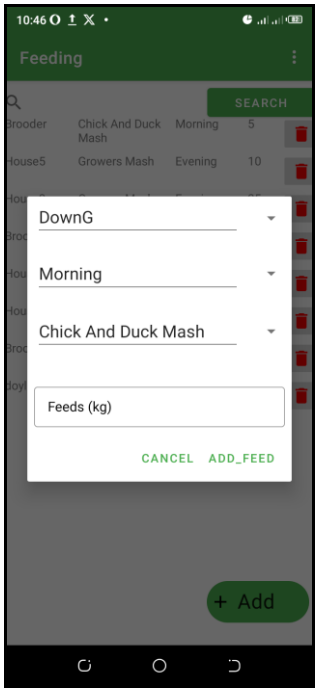

Figure 18: Add new Feed Record

The system is able to store sales on the farm and these include the number of trays sold, the unit price/ price per tray and then the total sales made for that day.

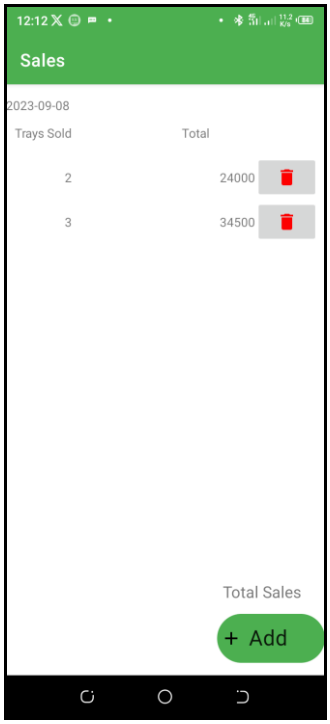

Figure 19: Sales Activity

The system is able to record expenses/purchases made by the farm and will also be able to display them for the user to view.

Figure 20: Purchase Activity

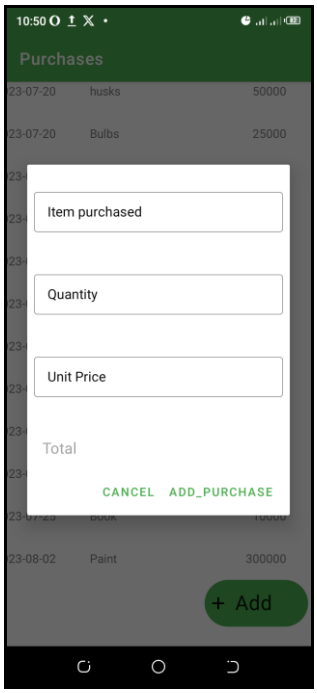

Figure 21: Add new Purchase

The system is able to allow the user to add a disease to the application and when it will be vaccinated or when medicine will be administered. The system will be able to show the diseases in the system and when they are to be vaccinated.

Figure 22: View Diseases

Figure 23: View Health Records

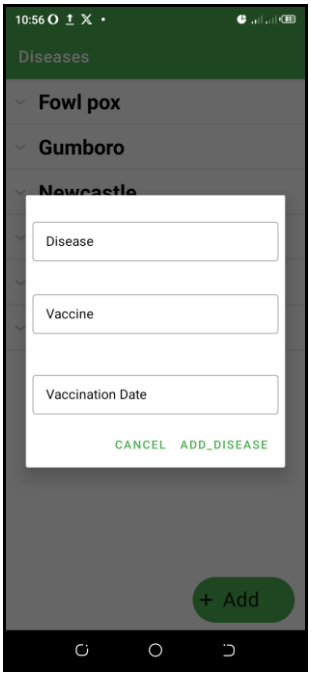

Figure 24: Add new Disease

The system is able to show in-app reports for the user such that the user can view the reports from within the application including egg reports, sales reports as well as expense reports.

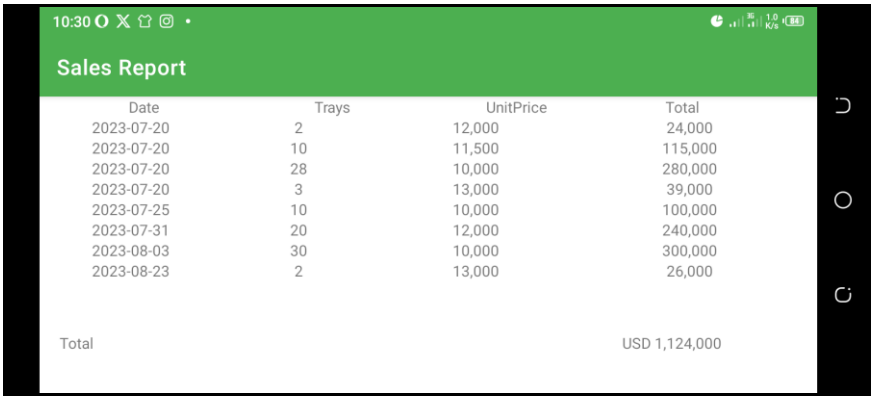

Figure 25: Sales Report

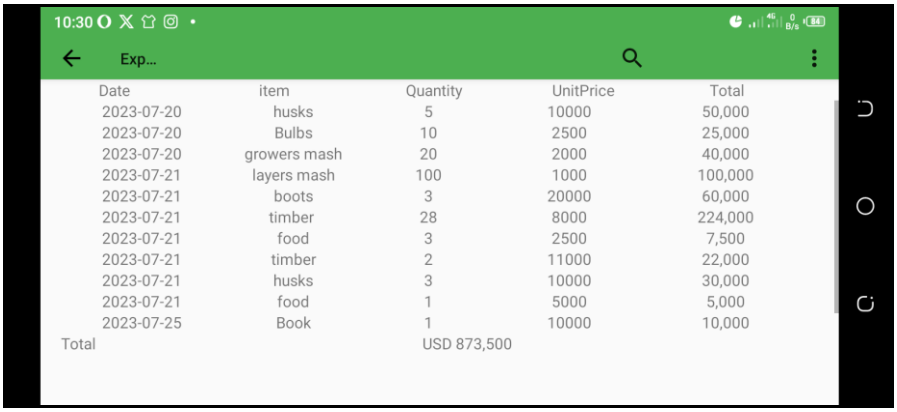

Figure 26: Purchases/Expenses Report

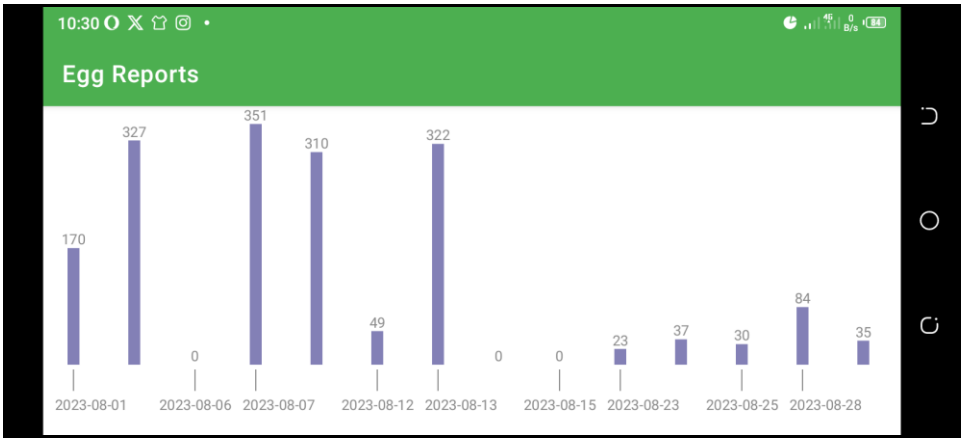

Figure 27: Eggs Report

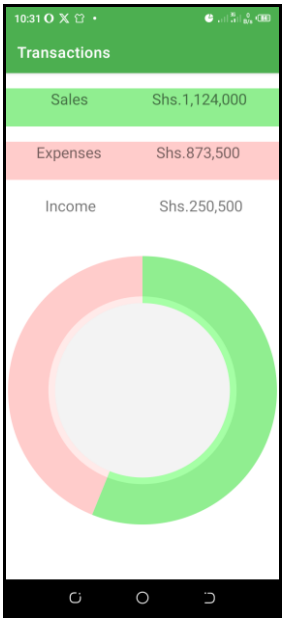

Figure 28: Transactions Activity

The user can also be able to set some settings as shown in the interface below.

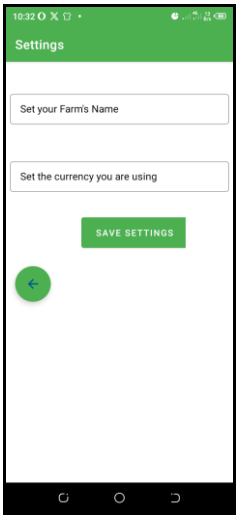

Figure 29: Settings Activity

The user can also rate the application and provide feedback to the makers of the application as shown in the interface below.

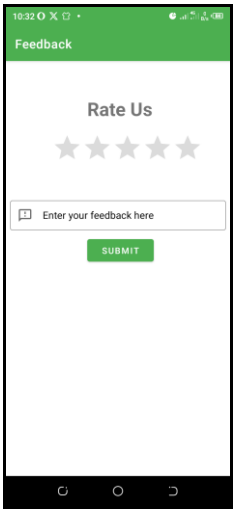

Figure 30: Feedback Activity

5.3 SYSTEM TESTING

On the completion of the implementation phase, the system or application was tested. It was tested as a whole and also unit and integration testing was done to ensure that the system did and performed the functions that it was meant to perform. System testing is a process of executing the system or application so as to find bugs and errors in the system. The testing that was done on the poultry management system was done at different levels. Testing was done on the application as a whole to ensure that it was running and was compatible with various devices for which it was intended to run on. Testing was then done on the various modules and then integration testing was done to see how the system integrated with the existing system.

5.3.1 UNIT TESTING

Unit testing was done on the poultry management system. Each unit of the system was tested using codes to see and find out if what it was meant to do is what it is actually doing or performing. For example, the eggs activity or page was examined and tested to see if someone added a collection, the collection is stored in the database and to see if it would bring the right total of eggs collected on that particular day.

5.3.2 INTEGRATION TESTING

Integration testing was done after implementation had been completed to find out how the different modules integrated with the each other in the system. Integration is aimed at making sure that the various components of the system are collaborating or co-operating with each other to ensure that the functional requirements of the system are realised or achieved. For example, the eggs activity was tested for integration testing to find out if it collaborated with the eggs reports' activity such that the information entered in one is integrated or matches with that which is viewed in the other.

CHAPTER 6: DISCUSSION, CONCLUSION AND RECOMMENDATIONS AND FUTURE WORK

6.0 INTRODUCTION

This chapter deals with the findings that are realized after developing the poultry management system in relation to the set objectives. The study found out that the farm fully relied and used the manual system for record keeping that involves papers and books where eggs are written and recorded on paper then in books, sales and purchases are physically in books. So the poultry management system has been designed and developed to replace the manual records keeping system that's being used at JWF Poultry Farm.

6.1 DISCUSSION

The discussion is based on the objectives that were set earlier in chapter 1 and how the system has been implemented.

Objective 1) To determine the requirements of the online poultry management system.

I was able to carry out research from various resources so as to determine the requirements of the online poultry management system. I carried out internet research so as to be able to view some of the existing poultry management system that are being used in other places. I was also able to obtain information that would be able to come up with or develop the DFD diagram, Use Case diagram which are critical to the design process and how the various system components interact with each other. I was therefore able to determine the functional and non-functional requirements of the system. During the field research, I was able to obtain the information on how the interfaces would appear as per the users of the system as the interface is critical to developing a good system.

Objective 2) To design the online poultry management system.

The online poultry management system was then designed basing on the functional and the non-functional requirements that had been obtained and gathered as per the first objective. This phase of design involved determining which model of system development that I was to use to implement it. It also involved determining and finding out which architecture the system was to take on or follow during its development. It also included coming up with the DFD diagram, Context diagram as well as the use case Diagram that showed how the various system components interacted so as to achieve the functional and non-functional requirements of the system.

Objective 3) To implement the online poultry management system.

The implementation of the online poultry management system was done using various tools and these included the following; I used android studio which uses Intellij IDEA as its editor to develop or come up with the code for the android application. I made the application using Java Programming language and all this was using the Windows Operating System. All these were used to develop the interfaces as shown in chapter 5. I also used Firebase Database which is a subsidiary or falls under Google Cloud and this database is not a table or SQL database but it is designed in form of a JSON tree. The database is on the cloud so this makes the online poultry system an online system because the data is not stored locally on the device but it is store on the cloud and can thus be accessed using and from multiple devices.

Objective 4) To test and validate the online poultry management system.

The system was tested during and after implementation. The testing that was carried out was system testing where the system is tested as a whole and then also unit testing was also carried out.

The system testing was done to check if the system that had been developed was compatible with multiple devices and to see if any errors came up on the various devices.

Unit testing was then carried out on the various and different modules of the system. This was to ascertain that the different components of the system were functioning effectively and performing the tasks that they were meant to carry out.

Integration testing was thereafter done to see how each module in the system worked or interacted with the other so as to form a complete system. This integration testing was done after all the modules had been completed.

6.2 RECOMMENDATIONS

I recommend that the poultry management system be adopted by all other smaller scale poultry farms rather than just JWF Poultry Farm because it will be helpful to those individual farms and will help them realize the profits that they are supposed to have and also make the management of their respective farms easier which will in turn make poultry farming even easier to carry out because of the help provided by the poultry management system.

6.3 FUTURE WORK

In the future, I recommend that the application be expanded to include other farm animals rather than chicken only. Animals like cattle, goats to mention but a few can be added to make the application effective for diverse farmers who have multiple kinds of birds and animals on their farms.

In the future, I recommend that the application be improves as to cater for even the large scale farmers such that they can view or monitor the large farms as well rather than the small scale farms only.

In the future, I recommend that a web version of the application be made for desktop and large device users. This version will also make it easy for large scale poultry.

6.4 CONCLUSION

The poultry management system should be deployed at JWF Poultry Farm since it has been tested for all the requirements that it is supposed to accomplish and has proved to perform them well since the positive impact of the application is bigger than the challenges that could be faced while using the application as stated earlier. So this implies that the poultry management system is fit to be used at JWF Poultry Farm for its farm management.

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