

Goat Farming Information Management System

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Abstract

Goat farming is one of the main livestock industries in Malaysia that supplies the country's meat supply. Most goat farms, especially the smaller ones, keep their farm data manually despite technological advancements. Manual recording techniques are employed, along with file and book approaches. Even though farming activities can still be managed using this method, there are several drawbacks. These include the potential for calculation or data transfer errors, lengthy data entry procedures, and slow record searches. To address this issue, a web platform namely the "Goat Farm Management System" has been built. The plan aims to use digital and web technologies for the management of related livestock farm tasks and records. It optimizes computerized systems for efficient farm management and was built with PHP and MySQL. Agile methodology is employed in the development. The system's main features are registration, goat information management, buy and sales records, reporting, and administrative tasks. The system provides farm staff with the functionality to record and access goat herd data, goat herd health records and financial tracking. This digital transformation will help the goat farming business by increasing output and sustainability. By using this strategy, the Malaysian goat farming industry may embrace technology and overcome the challenges posed by manual data management.

1. Introduction

Goat farming has emerged as a significant sector within the agriculture industry, offering a sustainable source of income and livelihood for farmers worldwide [1]. With the increasing demand for goat products such as meat, milk, and fiber, goat farmers face the challenge of managing their farms efficiently to meet the demands of the market [2]. In Malaysia, goat farming is a thriving sector, with the nation's goat population rising by an average of 5% annually during the previous ten years [3][4]. As goat meat is viewed as a better and more environmentally friendly substitute for beef and chicken, demand for it is also rising [5]. In Malaysia, there are primarily two forms of goat farming: backyard and commercial. Large-scale businesses that grow goats for meat, milk, or fiber are known as commercial goat farms. Smaller enterprises known as backyard goat farms produce goats for personal use or for sale in nearby markets [6]. The Katjang goat, a little, hardy species that does well in Malaysia's tropical climate, is the most popular kind of goat there.

Traditionally, goat farm management relied on paper-based systems, which proved to be cumbersome, error-prone, and time-consuming [7]. The existing manual methods of managing goat farms have several drawbacks. Staff struggle with the laborious task of maintaining individual goat records, including identification, health

history, and breeding details [8]. Additionally, recording financial transactions related to goat sales and purchases on paper is not only prone to mistakes but also makes it difficult to analyze the overall financial health of the farm [9]. The lack of efficient record-keeping and data analysis delays the staff's ability to make informed business decisions, impacting productivity and profitability.

This proposed project intends to develop a Goat Farm Management System to overcome these obstacles and bring the goat farming sector to a better level in terms of business data management. The system will use object-oriented design and information technology to benefit from the advancement of digital technology. The aim of this project is to provide an intuitive and well-designed interface for a goat farm management system. The system interface will be designed to make it easy for workers to enter data and obtain important information about each goat on the farm. System design will ensure code modularity and maintainability by encapsulating operations into cohesive classes using object-oriented techniques.

The core development aspect of the Goat Farm Management System will focus on building a robust and scalable platform. This platform will be capable of efficiently tracking individual goat records, customer details, purchase details, and cash flow. Furthermore, the system will maintain accurate financial records, recording income from goat sales and expenses related to purchases and farm maintenance. To ensure the system's effectiveness and reliability, rigorous testing and validation will be conducted. Various scenarios will be simulated to assess the system's performance, functionality, and data accuracy. By identifying and rectifying any potential issues during the testing phase, the Goat Farm Management System will be fine-tuned to deliver optimum performance and precision.

This article is divided into several sections. It starts with the project background, followed by a study of related systems. Then discuss the process and results of analysis and design. Section 5 presents the findings and discussion, while the final section concludes the project.

2. Related Work

This section discusses the background of the case study, technology used, and comparison with existing systems. Managing livestock involves complex duties such as feeding (meat, dairy, eggs), and breeding (wool, fur). Livestock management is an important aspect of agriculture [10]. This was done manually in the past, which required exacting record-keeping and was time-consuming and prone to mistakes. As a result, insight into herd performance and overall efficiency was frequently limited. Agricultural computerized livestock management systems are becoming more and more prevalent because of the realization of these limitations [11]. These innovative platforms go beyond simply digitizing traditional record-keeping, using technology to increase efficiency and productivity in the industry [12];[13].

Reliability in animals' productivity and production estimation is one of the main issues these systems attempt to address [14]. The inefficiency of outdated paper-based record-keeping techniques has long been a source of dissatisfaction for farm employees engaged in goat farming. As a result of the lack of easily accessible and analyzed data, manual data entry is not only laborious and error-prone but also impedes the ability to make well-informed decisions. As a result, farmers frequently experience decreased profitability and productivity (lower milk production and slower growth rates). Nonetheless, this environment can be completely transformed by cutting-edge data management solutions created especially for goat farming. To address this challenge, researchers have developed various methods for various tasks in goat farming [15] - [19]. These data-driven strategies assist in the implementation of focused interventions, informed decision-making, and optimization of production techniques and general livestock management.

Data management for the goat farming industry refers to the process of gathering, archiving, and researching information on goat farming activities [20]. Informed business decisions may be made using this information to increase the health and productivity of the herd, monitor costs and earnings, and more. Goat farmers may gather a variety of data, including information on the identification of the animals, health information, information on breeding, information on milk output, financial data, and more. Utilizing this information, goat farmers can keep tabs on the productivity and health of their herd, spot any health issues, and take appropriate action, as well as monitor costs and production. The gathering of data regularly and consistently, as well as the implementation of a standard data collection system, are possible improvements to goat farming data management. For effective goat husbandry, good data management is crucial. Goat farmers may increase herd health and production, track costs and income, and make wise business decisions by effectively gathering, storing, and analyzing data.

An efficient farm management system, the Goat Farm Management System aims to tackle these issues. This system tracks goat records comprehensively, manages finances accurately and uses an object-oriented design to provide an intuitive user interface for rapid data entry. Staff members can check expenses, detect problems, and keep an eye on the health of the herd by using effective data management. Equipping goat employees with contemporary technology that promotes sustainable growth in the competitive world of agriculture, increases production, and makes informed decisions easier is the aim.

Malaysian agriculture depends on goat rearing, yet traditional paper-based data processing is still a significant bottleneck. Ineffective record-keeping, imprecise financial monitoring, and a dearth of easily accessible

information impede well-informed decision-making, which eventually affects output and earnings. Hence the web-based information system is optimized to build a computerized Goat Farm Management System. A web-based information system is a type of information system that is accessed and interacted with through a web browser over a network, typically the Internet [20]. It leverages web technologies to provide users with access to information, data, and functionalities. These systems are designed to facilitate the management, retrieval, and manipulation of data, often in a collaborative and user-friendly manner. Web-based information systems (WBIS) have led to significant improvements recently in the agricultural sector and optimized their use. WBIS has affected several aspects of agricultural operations and has increased output and general field efficiency [21][22].

To gain more information to support the proposed development of a new goat farm information system, examinations of the existing systems were conducted. The three existing balances are mainly examined from the operation of the system, the inventory process, and the use of the machine. Farmbrite system, Ranch Manager open-source system, and AgriWebb system were selected to compare with the proposed system. Table 1 provides details.

Table 1 System Comparison [12 – 14]

Features/System	Farmbrite	Ranch Manager open	AgriWebb	Goat Farming information management system
Registration and login module	Yes	No	Yes	Yes
Goat information management module	Yes	Yes	Yes	Yes
Account management	Yes	Yes	No	Yes
Report management	Yes	No	Yes	Yes
Database	MySQL	Microsoft Access	MySQL	MySQL
Programming language	PHP and JavaScript	Java	PHP and JavaScript	PHP and JavaScript
System type	Web-based	Desktop based	Web-based	Web-based

3. Methodology

In this project, agile methodologies were used in the software development process. This agile process has five main phases such as planning, design, development, testing, and deployment [14 - 19]. Repeat these steps until the system is stable and complete. Table 2 describes the various stages and activities of the agile process.

Table 2 Software development activities

Phase	Task	Output
Planning	<ul style="list-style-type: none"> Proposed the project. Determine the project schedule, activities, and output 	<ul style="list-style-type: none"> Project proposal Develop a Gantt chart.
Design	<ul style="list-style-type: none"> Create system architecture. Design user interface (UI) 	<ul style="list-style-type: none"> System architecture UI designs
Develop	<ul style="list-style-type: none"> Develop functional increments of the system 	<ul style="list-style-type: none"> Functional increments of the system
Testing	<ul style="list-style-type: none"> Perform unit testing. Conduct integration testing Perform user acceptance testing 	<ul style="list-style-type: none"> Tested functional increments
Deploy	<ul style="list-style-type: none"> Deploy the system to a test environment. Gather user feedback 	<ul style="list-style-type: none"> Deployed a system for user feedback

3.1 System requirements

Functional requirements determine the performance of the designed system, and its operation is defined as a specific behavior of converting input into output. Non-functional requirements are defined as the criteria about the way the system operates [13]. Tables 3 and 4 show the functional and non-functional requirements for the proposed system.

Table 3 *Functional Requirements*

Modules	Function
1. Login Module	<ul style="list-style-type: none"> • Enable staff to log in using username and password. • Verify user credentials against stored database data. • Show alerts for incorrect login attempts. • Redirect users to appropriate pages upon successful login. • Establish and maintain user login sessions. • Securely save profile changes in the database.
2. Goat Information Management module	<ul style="list-style-type: none"> • Enable staff to input and store individual goat details (breed, image, color, age, gender, and weight) in the database. • Enable users to update existing goat records and remove outdated entries. • Provide search functionality for goats based on criteria like ID, name, or breed. • Display comprehensive goat details, including vital statistics and health history.
3. Selling & Buying Record Management	<ul style="list-style-type: none"> • The system should support input for both buying and selling processes. • enable users to edit financial transaction reports within this context. • Provide search functionality for sale and purchase records based on criteria like ID and date. • Users can remove records also. • User can view and print invoices. • Display comprehensive details.
4. Report Management module	<ul style="list-style-type: none"> • Allow users to view statistical reports by month.
5. Livestock Management module	<ul style="list-style-type: none"> • Enable staff to input and store individual goat livestock details (breed, quantity, and supplier details) in the database. • Enable users to update existing goat livestock records and remove outdated entries. • Provide search functionality for goat livestock records based on criteria like ID, supplier name, or breed. • Display comprehensive goat livestock details.

Table 4 *Non-Functional Requirements*

Requirements	Description
1. Operational	The system should be easy to manage and update. The system must be able to run in multiple web browsers.
2. Performance	The system should be available 24 hours per day. The system should get access to the Internet easily. The system should be well-designed.
3. Security	Users can only access their accounts using their username and password.

The demand and need of the user for the system's functioning can be referred to as the user requirements. The user requirements of the system are shown in **Table 5**.

Table 5 *User Requirements*

User Requirements
1. Users must be able to log in to the system by entering their username and password.
2. Users can input details about individual goats (breed, age, weight, gender, etc.) and store goat information in the database.
3. Users should be able to update, delete, search, and view details of the goat.
4. Generate statistical reports related to goat farms.
5. Users can record incoming and outgoing processes related to selling and buying.
6. Users can edit financial transaction reports within this context.
7. Users must be able to log out of the system.
8. Administrators must enter their administrator username and password to log in to the system.
9. Administrators must be able to create new users.
10. Administrators can add, view, delete, and edit information.
11. The administrator manages the database.
12. Administrators must be able to log out of the system.

3.2 System Analysis

Requirements analysis is a process for determining system features. This includes all business processes for evaluating the results of different stakeholders. Special audits for this purpose include examining, documenting, analyzing, and performing software or system specifications. This paragraph provides an overview of the methods used to gather requirements from stakeholders. It emphasizes the comprehensive approach taken, which includes various techniques such as interviews, surveys, and observations. This detailed approach ensures that all user needs are captured accurately, leading to the development of a system that meets the users' expectations. By incorporating feedback from multiple sources, the system analysis phase aims to create a robust foundation for the subsequent design and development phases. This approach helps in identifying not only the immediate needs but also potential future requirements, ensuring the system's scalability and relevance over time.

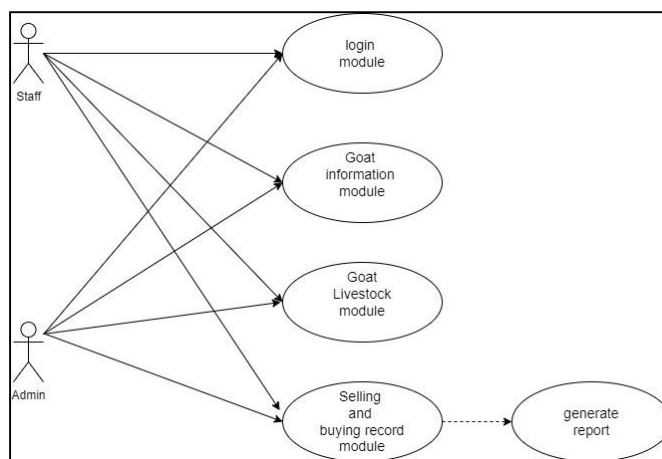


Fig. 1 *Use Case Diagram*

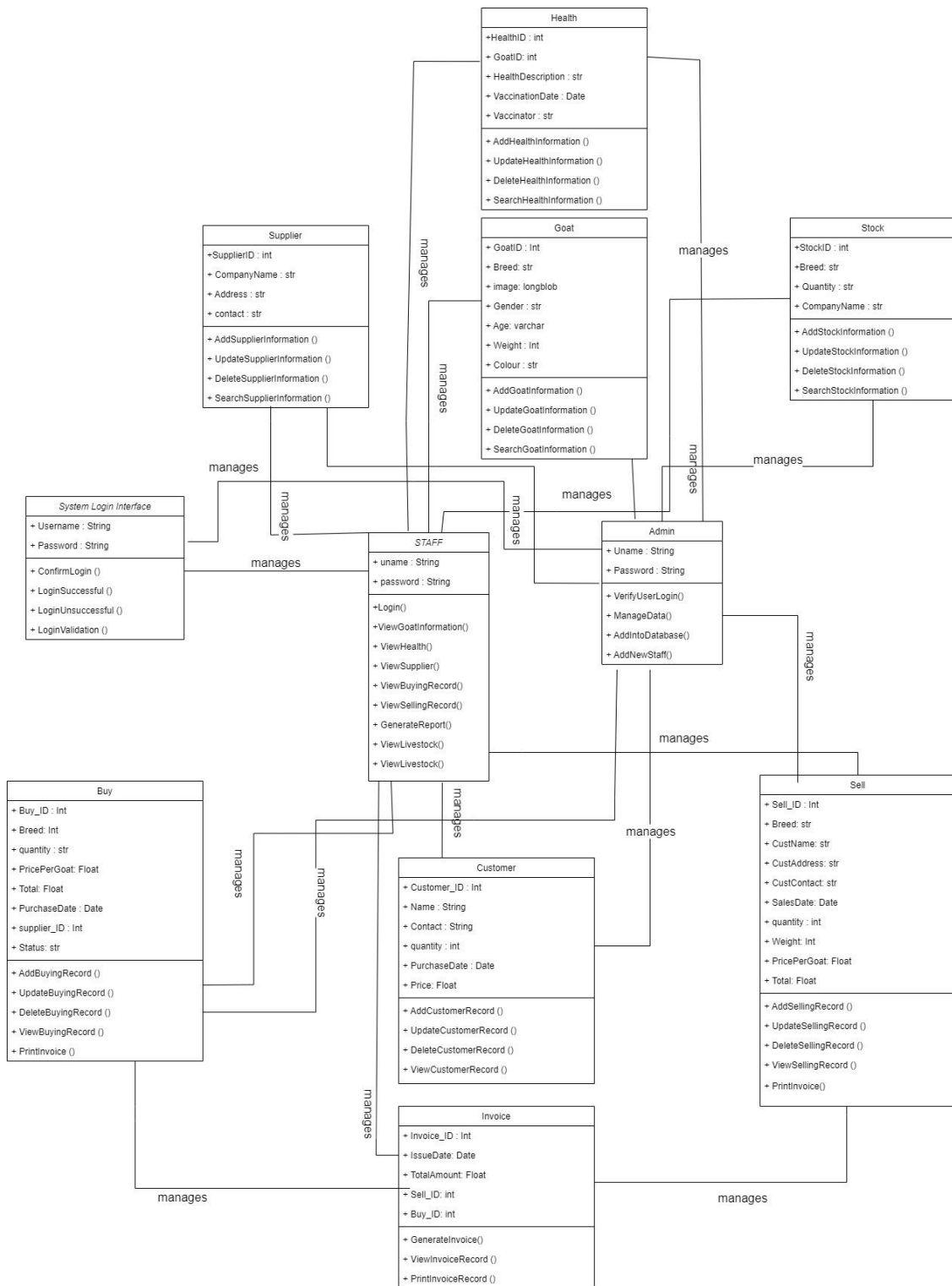


Fig. 2 Class Diagram

Figure 2 shows the class diagram which describes the static view of a system. The Entity Relationship Diagram for the information management system for goat farms is displayed in Figure 3. The graphic illustrates the relationship between database entities, highlighting the data utilized in each step and the relationships between the files.

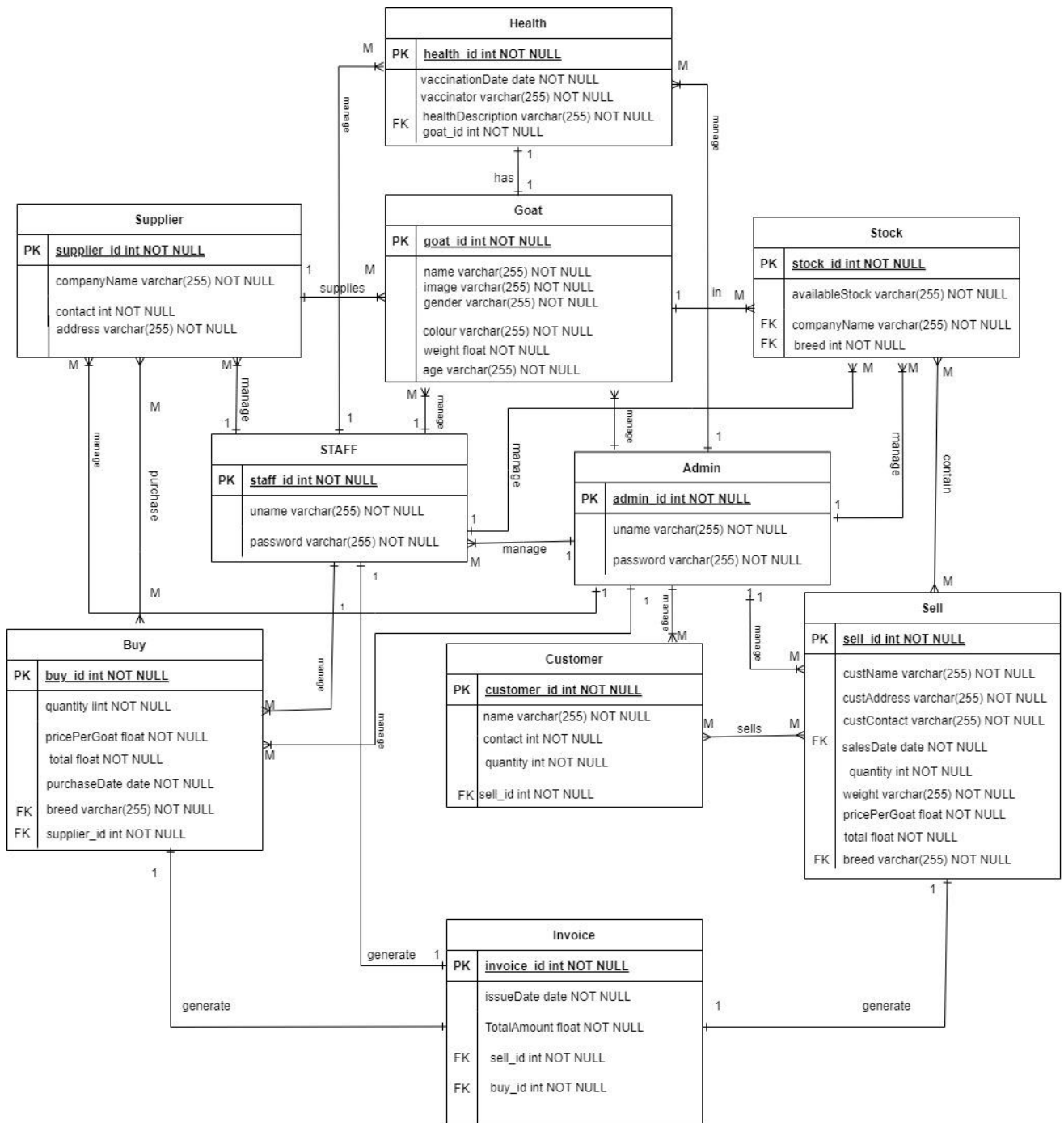


Fig. 3 Entity relation diagram

Figure 4 shows the flowchart of the developed system and how the system works from the start is shown in detail.

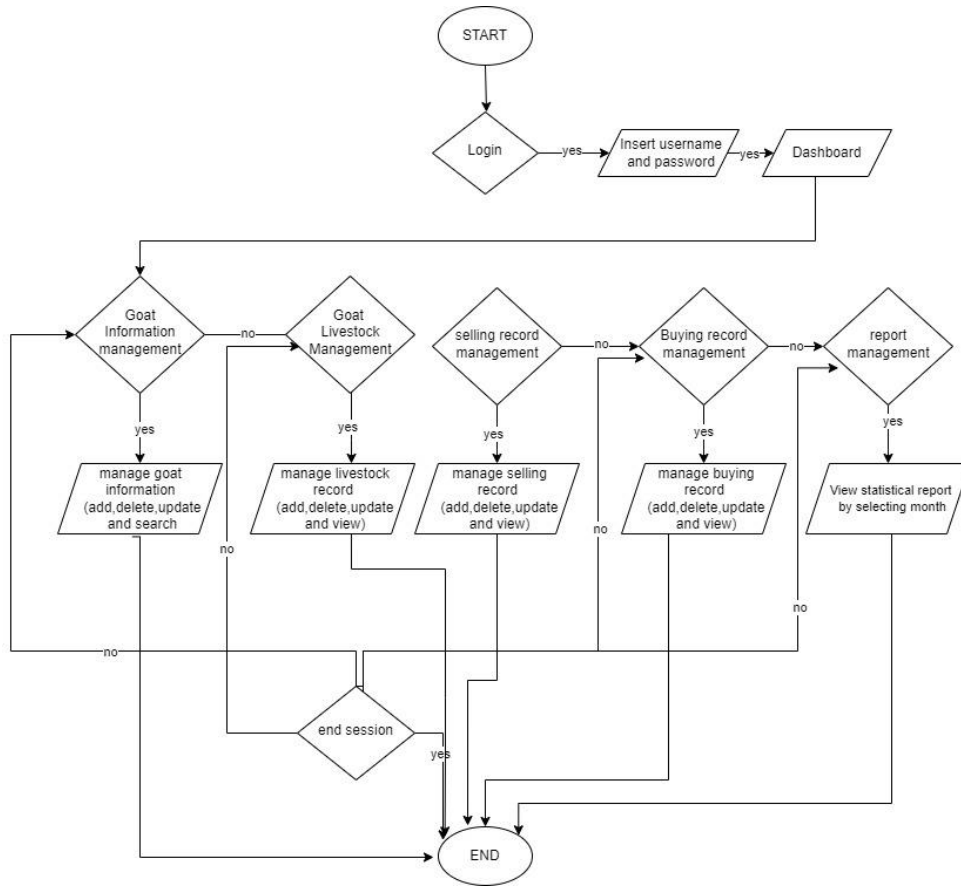


Fig. 4 Flowchart of the new system

3.3 System Design

The system architecture for this system is shown in Figure 5. This system architecture consists of several interconnected parts that allow data on goat farming activities to be more easily collected, stored, processed and shared.

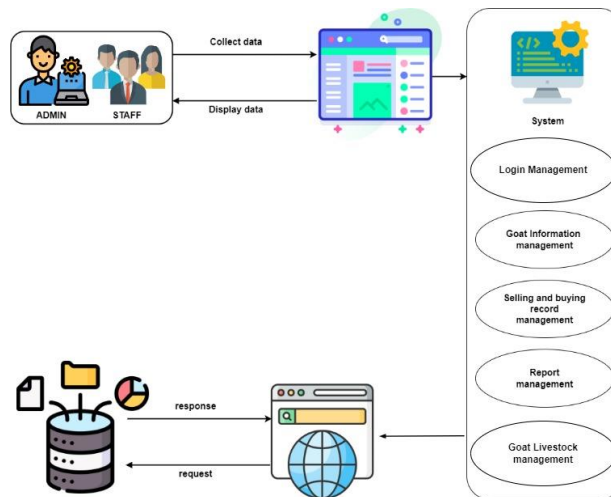


Fig. 5 System's architecture model

Figure 5 illustrates the system’s architecture. The goat farm management system has the following relational schema of database tables:

- i. Staff (staff_id, uname, password)
- ii. Goat (goat_id, breed, image, gender, colour, weight, age)
- iii. Health (health_id, goatID, vaccination_date, health_description, vaccinator)
- iv. Supplier (supplier_id, company_name, contact, address)
- v. Stock (stock_id, breed, quantity, company_name)
- vi. Buy (buy_id, breed, quantity, price_per_goat, total, purchase_date, supplier_id, status)
- vii. Sell (sell_id, breed, cust_name, cust_address, cust_contact, sales_date, quantity, weight, price_per_goat, total)
- viii. Admin (admin_id, uname, password)

Fig. 6 User Registration Page

Fig. 7 User Login Page

Fig. 8 New Goat Data Page

Fig. 9 Goat Details Page

Figure 6 shows the user registration page and **Figure 7** for the login. Staff and administrator can access each menu table to add, search, edit, and delete each information of the goat. The goat’s health information interface is displayed in **Figure 8** and **9**. Staff can use the form to add goat’s health condition by filling in the vaccination date and health description. Each goat’s health information that has been stored in the database can be viewed, updated, deleted, and searched by staff and administrator.

Fig. 10 New goat data page

Fig. 11 New goat data page

Fig. 12 Goat stock data page

Fig. 13 Goat selling data page

The goat health record is shown in Figure 10. The supplier details interface is displayed in **Figure 11**. Staff can use the form to add new supplier details. All supplier information that has been stored in the database can be viewed, updated, deleted, and searched by staff and admin. **Figures 12** and **13** show pages for goat stock and selling.

The findings from the analysis and design phase will be used further in the implementation phase.

4. Results and Discussion

Use a web-based platform to create a system. In this section, application and test results are presented. The system was developed using HTML, CSS, and PHP programming languages. The software used is MySQL and Adobe Dreamweaver.

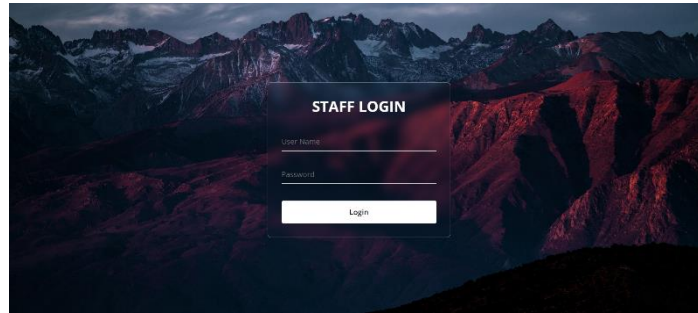


Fig. 14 Staff Login Interface

Figure 14 shows the user interface of the login page of the Goat Farm Information Management System. **Table 6** shows the test case for the login module. There are a total of 4 tests. The purpose of this test is to verify that the staff and admin can log in to the system and that if the login is incorrect, the system gives an error message.

Table 6: Test Case for staff and admin Login Module

Test Case ID	Description	Expected Output	Actual Output
M1-1	To check whether an administrator can register a new staff account	The admin should be able to create a new staff account	The admin has successfully created a new staff account
M1-2	To check whether an administrator can log in to the system	The admin should be able to log in to the system	The admin has successfully logged in to the system
M1-3	Admin and users enter valid username and password	Login successful	As expected
M1-4	Admin and users enter invalid username and password	Login unsuccessful	As expected

The main page, Goat Index **Figure 14**, displays all goat records in a table where admin and staff can manage the goat data. They can add, view, update, and delete entries, as well as search and sort the data for better organization. The "Add New" button allows staff and admin to input new goat information through a form as shown in **Figure 15**. The test case for goat information management is shown in **Table 7**. For this module, there are five test cases. The purpose of this test is to verify whether the user is allowed to create new data and whether the system allows the user to edit, search, or delete the data.

GOAT ID	BREED	IMAGE	GENDER	COLOUR	AGE (YRS)	WEIGHT (KG)	ACTION
11	Nubian		Female	Brown and white	10	61	
12	Boer		Male	brown and white	12	150	
13	Alpine		Female	white with black markings	11	75	
15	Angora		Female	White	12	50	
16	Taggenburg		Male	Light brown with white markings	10	70	
17	Pygmy		Female	Caramel and black	10	25	

Fig. 14 Goat Information Interface

Fig. 15 Add Goat Form

Table 7: Test case for goat information module

Test Case ID	Description	Expected Output	Actual Output
M2-1	To check whether admin and staff can add new goat information	The admin and staff should be able to add new goat information	The admin and staff successfully added new goat information
M2-2	To check whether the admin and staff can view goat information	The admin and staff should be able to read goat information	The admin and staff successfully read goat information
M2-3	To check whether the admin and staff can edit goat information	The admin and staff should be able to edit goat information	The admin and staff successfully edited goat information
M2-4	To check whether the admin and staff can delete goat information	The admin and staff should be able to delete goat information	The admin and staff successfully deleted goat information
M2-5	To check whether the admin and staff can search for goat information	The admin and staff should be able to search for goat information	The admin and staff successfully searched for goat information

Figure 16 - Figure 21 depicts the sale and purchase record interface to manage information. Admin and staff can add, update, view, and delete items from the list. The data can also be searched and sorted based on the preferences of the admin and user. Staff and admin can print the invoice. The test case for managing sales and purchases is shown in Table 8. For this module, there are seven test cases. The purpose of this test is to verify whether the user is allowed to create new data and whether the system allows the user to edit, search, or delete the data.

SELL ID	GOAT	CUSTOMER NAME	CUSTOMER ADDRESS	CUST
7	Nubian	Dhevika	No.110, Taman Dato Undang abdullah,71600 Kuala Kelawang,Negeri Sembilan.	01457
8	LaMancha	Megala	No.1271 Lorong Angsana 40, Taman Keladi, 08000 Sungai Petani, Kedah.	0109E
10	Toggenburg	Sharveena Sivakumar	No.1266 Lorong Angsana 40, 08000 Sungai Petani, Kedah.	0189C
11	LaMancha	Puvendran	No.12, Taman Serindit, Bukit Rotan, Selangor	0102E
12	Boer	Priya	No.47, Taman Cheras 56000, Kuala Lumpur.	01477

Fig. 16 Sale record Interface

GOAT PURCHASE MANAGEMENT + Add New

BUY ID	BREED	QUANTITY	PRICE PER GOAT (RM)	TOTAL (RM)	PURCHASE DATE	SUPPLIER ID	STATUS	ACTION
1	Boer	2	46	92	2024-05-22	3	Partially received	👁 ✎ 🗑
2	Toggenburg	3	50	150	2024-05-21	1	Partially received	👁 ✎ 🗑
3	LaMancha	2	40	80	2024-05-19	3	Pending	👁 ✎ 🗑
4	Nubian	2	80	160	2024-05-04	3	Pending	👁 ✎ 🗑

Fig. 17 Purchase record Interface

SELLING RECORD

Fill out the form below.

Select goat breed

Quantity Available

Customer Name

Customer Address

Customer Contact

Sales Date

Quantity

Weight (KG)

Price Per goat (RM)

Total (RM)

Submit

Cancel

View Already Inserted Detail [View](#)

Fig. 18 Add new sale form

BUYING RECORD

Fill out the form below.

Breed

Quantity

Price per goat (RM)

Total (RM)

Purchase Date

Supplier ID

Status

Submit

Cancel

View Already Inserted Detail [View](#)

Fig. 19 Add new purchase form

INVOICE

Quba Goat Farm
Gelang Patah, Johor
189072584

BILL TO
Aiyaa Biotech Goat Farm
 Lot 901, Jalan Kaki Bukit
 Bukit Temiang,
 02400 Berseri,
 Perlis.

Goat	Quantity	Price per Goat (RM)	Total (RM)
Boer	2	RM 46	RM 92
Total			RM 92

Print 1 page

Destination Save as PDF

Pages All

Pages per sheet 1

Margins Default

Options

Headers and footers

Background graphics

Save Cancel

Fig. 20 Print invoice interface

INVOICE

Quba Goat Farm
Gelang Patah, Johor
189072584

BILL TO
Aiyaa Biotech Goat Farm
 Lot 901, Jalan Kaki Bukit
 Bukit Temiang,
 02400 Berseri,
 Perlis.

Goat	Quantity	Price per Goat (RM)	Total (RM)
Boer	2	RM 46	RM 92
Total			RM 92

Invoice Number **INV1**

Date **22 May 2024**

Fig. 21 Invoice interface

Table 8: Test Case for sale and purchase Module

Test Case ID	Description	Expected Result	Actual
M3-1	To check whether the admin and staff can add a new sale and purchase record with all fields filled	The admin and staff should be able to add a new sale and purchase record	The admin and admin successfully added a new sale and purchase record
M3-2	To check whether admin and staff can view sale and purchase records	The admin and staff should be able to view sale and purchase records	The admin and staff successfully viewed the sale and purchase records
M3-3	To check whether the admin and staff can edit a sale and purchase record with all fields filled	The admin and staff should be able to edit a sale and purchase record	The admin and staff successfully edited a sale and purchase record
M3-4	To check whether the admin and staff can delete a sale and purchase record	The admin and staff should be able to delete a sale and purchase record	The admin and staff successfully deleted a sale and purchase record
M3-5	To check whether the admin and staff can search for sale and purchase records	The admin and staff should be able to search for sale and purchase records	The admin and staff successfully searched for sale and purchase records
M3-6	To check whether the system shows a warning when the admin or staff tries to add or edit a purchase and sale record with empty fields	The system should show a warning indicating that fields cannot be empty	The system displayed a warning for empty fields
M3-7	To check whether admin and staff can print an invoice for a sale and purchase record	The admin and staff should be able to print an invoice for a sale and purchase record	The admin and staff successfully printed an invoice for a sale and purchase record

Figure 22 and Figure 23 depict the goat livestock interface to manage information. Admin and staff can add, update, view, and delete items from the list. The data can also be searched and sorted based on the preferences of the admin and user. The test case for managing livestock is shown in Table 9. For this module, there are five test cases. The purpose of this test is to verify whether the user is allowed to create new data and whether the system allows the user to edit, search, or delete the data.

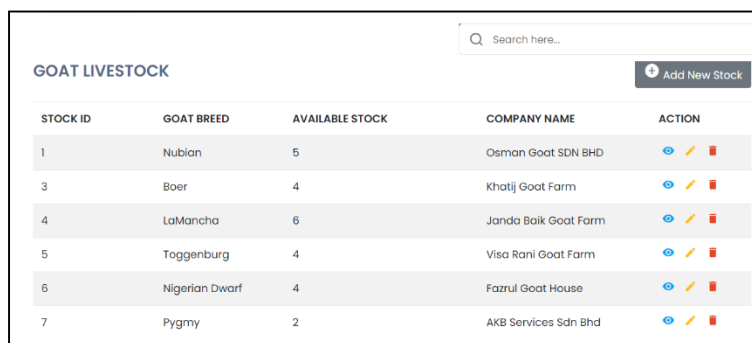


Fig. 22 Goat Livestock record interface

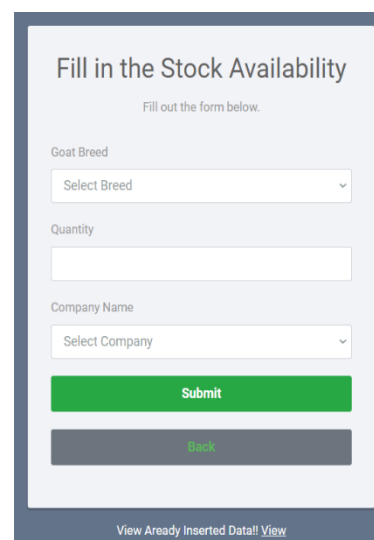
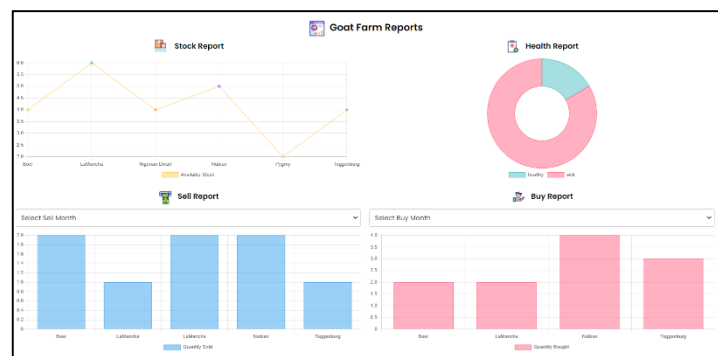


Fig. 23 Goat Livestock record interface

Table 9: Test case for goat livestock module

Test Case ID	Description	Expected Result	Actual
M4-1	To check whether admin and staff can add a new goat livestock record with all fields filled	The admin and staff should be able to add a new goat livestock record	The admin and staff successfully added a new goat livestock record
M4-2	To check whether admin and staff can view goat livestock records	The admin and staff should be able to view goat livestock records	The admin and staff successfully viewed goat livestock records
M4-3	To check whether the admin and staff can edit goat livestock information	The admin and staff should be able to edit goat livestock information	The admin and staff successfully edited goat livestock information
M4-4	To check whether the admin and staff can delete goat livestock information	The admin and staff should be able to delete goat livestock information	The admin and staff successfully deleted goat livestock information
M4-5	To check whether the admin and staff can search for goat livestock information	The admin and staff should be able to search for goat livestock information	The admin and staff successfully searched for goat livestock information
M4-5	To check whether the system shows a warning when admin and staff try to add or edit goat livestock information with empty fields.	The system should show a warning indicating that fields cannot be empty	The system displayed a warning for empty fields

Figure 24 depicts the goat farm statistical report interface to view information. Admin and staff can view data based on the preferences of the admin and user. The test case for view charts is shown in **Table 10**. For this module, there are three test cases. The purpose of this test is to verify whether the user can choose the month and view the data.

**Fig.24** Farm statistical report interface**Table 10: Test Case for Goat Farm Report Module**

Test Case ID	Description	Expected Result	Actual
M5-1	To check whether the admin and staff can select a month and view a bar chart for goat sales and purchase	The admin and staff should be able to select a month and view a bar chart for goat sales and purchase	The admin and staff successfully selected a month and viewed a bar chart for goat sales and purchase
M5-2	To check whether admin and staff can view a pie chart for the number of healthy and sick goats	The admin and staff should be able to view a pie chart showing the count of healthy and sick goats	The admin and staff successfully viewed the pie chart showing the count of healthy and sick goats
M5-3	To check whether admin and staff can view a line chart for the number of goat livestock by breed	The admin and staff should be able to view a line chart showing the number of goat livestock by breed	The admin and staff successfully viewed the line chart showing the number of goat livestock by breed

5. Conclusion

Goat farming's conventional approach to data management is insufficient to meet modern needs. The presented "Goat Farm Management System" addresses this problem by providing an object-oriented web-based method for efficient data entry, retrieval, and analysis. With its emphasis on customer information, financial transactions, critical goat data, and ease of use, this system has great potential for the sector. The benefits include better financial tracking, scalability, better health management, and improved data accuracy. Goat farmers who embrace this digital transformation can save time, improve information management, and usher in a new era of smart farming productivity.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

*The authors confirm contribution to the paper as follows: **study conception and design:** Sharveena Sivakumar, Nureize Arbaiy; **data collection:** Sharveena Sivakumar, Nureize Arbaiy; **analysis and interpretation of results:** Sharveena Sivakumar, Nureize Arbaiy; **draft manuscript preparation:** Sharveena Sivakumar, Nureize Arbaiy. All authors reviewed the results and approved the final version of the manuscript.*

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