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A Development using the Rapid Application Model of peTrace: Peter's Poultry Supply Sales and Monitoring Management System

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ABSTRACT

The poultry industry includes other support industries such as feed production and distribution, veterinary and poultry equipment production and distribution, meat and egg processing, marketing and distribution, and so on. Poultry production in the tropics. The poultry supply business is not prevalent in the province of Oriental Mindoro, that has a land area of 588,350 ha that supplies agriculture crops and livestock production, in addition to 286 registered business names, the plurality of which are linked to poultry supply. And one of the towns in Oriental Mindoro is recognized for producing agriculture and aquaculture. Rapid Application Method (RAD) is a software development methodology that emphasizes rapid prototyping through design. This type of testing modifies the software system before it is implemented. And Alpha testing was carried out by the Information Technology Practitioner. The system peTrace was ready for evaluation after several design and functionality issues were resolved. Purposive sampling was applied by the proponents this is to identify the 50 respondents so that the evaluators could have an accurate evaluation result. Information Technology Practitioners, store owners, staff, and clients were among those who responded. Owner, staff utilized the peTrace several times, testing its functionalities and verifying its usability. The proponents adapted the evaluation questionnaire using the ISO 25010 software quality criteria. To modify the five assessment criteria, ISO 25010 quality software standards were used. According to the assessment findings, peTrace is helpful and performs as predicted in terms of functional appropriateness (4.90), performance efficiency (4.85), usability (4.83), security (4.83), and maintainability (4.82). The peTrace system is broad in design, simple to maintain, and adaptable to any portable device independent of operating system, making it suited for any local Feed Store. For future growth, the assessors advise using real-time analysis. A good system will offer continuous monitoring with few, if any, delays.

INTRODUCTION

The poultry industry includes other support industries such as feed production and distribution, veterinary and poultry equipment production and distribution, meat and egg processing, marketing and distribution, and so on. Overall, millions of Filipinos derive their livelihood from activities that are directly or closely related to poultry production (Lambio, A. L. (Ed.). (2012). Poultry production in the tropics. UP Press.). Due to its agriculturally suited area, Oriental Mindoro is recognized as the "Rice Granary and Fruit Basket of Southern Tagalog". And one of the towns in Oriental Mindoro is recognized for producing agriculture and aquaculture. With a land area of 49,820 hectares, the town called Bongabong has four big rivers and these are Lisap, Bongabong, Sukol, and Orconuma—that water most of the farmlands in Bongabong. Because it is one of the largest suppliers in the province, Bongabong also has a rich production of livestock. This results in a boom in establishments selling the products of animals in every area of Bongabong, like Peter's Poultry Supply. It is located in Poblacion, Bongabong, Oriental Mindoro. Owned by Peter Malalauan. This offers chicken and pork feed, Tether, LPG Gas, Veterinary medicine. As well as various types of rice it is recognized as the most outstanding JetBest partner in 2017 because of being an operative in selling and supplying animal products. As a result, proponents will develop a system to track product sales. This will allow the staff and owner to determine which products are the most and least popular in their store. This will also teach the owner how to balance the purchase of the products. A "web-based sales monitoring" describes the process of tracking and analyzing sales data using a web-based application or platform. Information like sales data, client details, and inventory levels may be included. It can also be connected with other company systems, such as accounting software or customer relationship management (CRM) systems, to provide a holistic view of sales activity. Peter Poultry Supply would be better able to track and analyze sales data in real time with the adoption of a web-based sales monitoring system, enhancing their capacity to take prompt and precise judgments. The solution would also make it possible for the remote sales crew to access and modify sales data from any place, enhancing teamwork and communication. Thus, in the system to be developed, the user will be the cashier at Peter's Poultry Supply. The user will be assigned to monitor the sales of the store, he or she will be responsible for sending the status of the sale within one day of the store to the manager or owner. And for the system to be functional, the user will provide its information in User Login. This is to make sure that

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only employees are allowed to access the system. Her or his task at Peter's Poultry Supply is to input the number of products sold in a day in the database. Then, it will display in Sales Analytics, which covers the overall sales report for Peter's Poultry Supply. This will show weekly sales, currently available stock, and the overall sales report. After that, the owner will determine which products have had the least sales in a given day or week and balance the purchase of those products from their supplier to avoid having an overstock of those products in their store. The support of the owner, staff and customers in the proposed system will help the proponents in developing a reliable, fast-processing, and friendly-user system that can be used to maintain the sales of a growing business-like Peter's Poultry Supply. Generally, the study aims to develop a Web Based Management Monitoring of Sales in Peter's Poultry Supply To develop a web-based monitoring system that is user-friendly and easy to use for employees of Peter's Poultry Suppl and evaluate the effectiveness of the current sales monitoring system and determine if a web-based system would be a more efficient and effective solution for understanding the needs and preferences of customers to inform product development and marketing strategies to test the web-based monitoring system and gather feedback from employees to ensure it meets the company's needs and objectives analyze the data collected from the web-based monitoring system to make datadriven decisions that will improve sales and increase revenue for Peter's Poultry Supply.

LITERATURE REVIEW

This chapter presents related literature and studies that address the following concepts, understandings, ideas, generalizations, or conclusions, as well as various development developments to self-service technology from the past to the present, and which serve as a starting point for the researcher in developing the project.

As the family-style agricultural model has gradually been phased out, China's livestock farming has evolved toward the fad of intense, in recent years, there has been an increase in largescale and intelligent farming. (Zhang et al., 2019a; Tan et al., 2020). Using modern technology and supported by the Internet of things the livestock of the farmers helps a lot to solve the problems or shortcomings of traditional livestock farming. Living in a recent modern day in a new generation that promotes the integration and innovation of technologies that will help to enhance the productivity and innovation of all farmers is extremely important to promote and develop. As a result, transforming the life of every farmer in their livestock with traditional and old-line agricultural management skills is no longer possible, and they'll be pushed back into history. The increased consumption of chicken around the world has prompted the rise of chicken breeders

(Caldas et at., 2018). One of the factors or the foundation of it is the low cost or low price of animal protein, which aids in the development of chicken breeders (Mueller et al., 2018). The intended market for poultry production systems is generally divided into two categories: eggs and meat. To obtain or achieve food safety and quality, it is necessary to improve accountability accountability, as well as security, durability, and consistency. (Feng et al., 2019, Tsang et al., 2017). One of the solutions to attain agri-food traceability is to have data privacy and pressurized concerns (Caro et al., 2018). One of the mechanics for solving the transparency and security issues for farmers, procedures, managers, government, and consumers is blockchain technology.

As described in the literature (Tullo et al., 2018; Lovarelli et al., 2020; Garcia et al., 2020), Precision livestock farming or also known as PLF helps the management to consistently monitor and control the sales or income for unexpected results. In addition, it can upgrade the resources to utilize and decrease the breeding cost. PLF will be a big help in the future if only it will accelerate (Garcia et al., 2020; Maia et al., 2020). These studies are centered on market demands related to general public policies and concern for consumers' wants, as well as the efficacy and expansion of poultry firms in the poultry sectors. (Lashari et al., 2018). Wednerkar & Dalu, 2018. In research related to Supply Chain Management or also known as SCM in the agro-industrial sector the main objective or goal of the present research is to evolve a framework to help or to develop a great delivery to the end user market. McKenzie et al., (2018) to achieve unimaginable growth in poultry production and livestock in a specific and in general and to increase the performance of the poultry businesses the connection between the suppliers and the farmer growers must inspect. The use of SCM in farming is a big help to them to have better control over the companies and to release product modularity. In the research of Sullivan et al. (2018) the food and agriculture Organization (FAO) it was mentioned that the rate of food production is linked to the rate of food consumption growth. It has been mentioned that the industrial ecology requires the following goals: a friendly budget, positive energy, industries, and more. On the other hand, when years pass by, the supply and demand for food prices will increase and be unstable. It is a great privilege for the researcher to research this agro-food and agro-industrial studies. According to Edison K. Fahadi B, Makanto M.N., Djenny B, Mayaza LS. (2021), the Poultry Farm Management Information System of Biyinzika Poultry Farm International Limited, stating that the software system was designed and section base into their sales management, and to solve some circumstances that the systems are bound to face in the future. Still, the system has many problems, it lacks information and data recovery of data when some circumstances might occur when sharing a real-time or might have an unexpected disaster, using manually in making a report on sales, purchases, and products. It is time-consuming in reviewing if there are still stocks after release or deliver that cause the company to increase their cost.

METHODOLOGY

This chapter presented the methods and procedures undergone by the project. The Rapid Application Method (RAD) is a software development methodology that asserts rapid prototyping. above through design. RAD puts an emphasis on software and user input over meticulous planning and requirements specification.

Figure 1 illustrated the Rapid Application Development

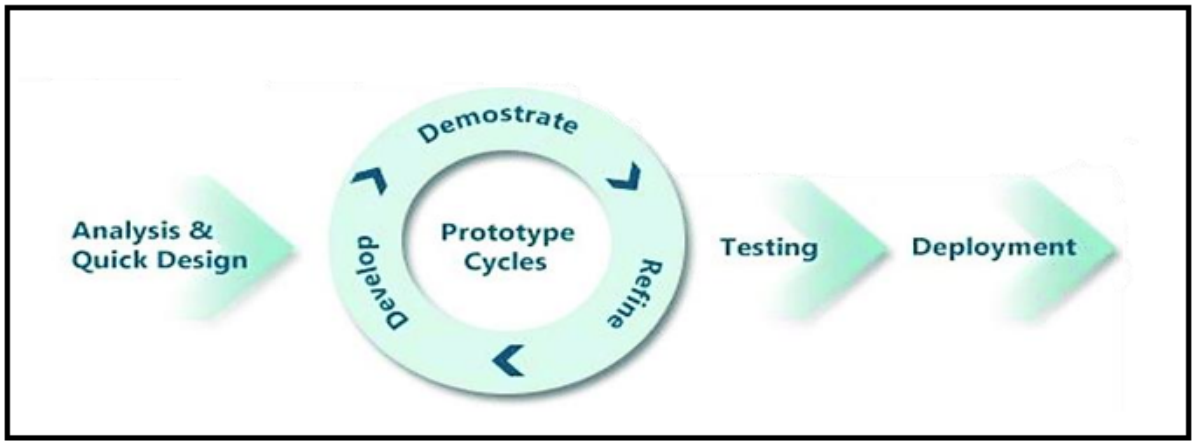

Figure 1: Rapid Application Development (RAD) (Zuhairah Arrif Abd Ghadas, 2015)

procedure including the following phases: Analysis and Quick Design. The data needed in the development of the system as well as the materials have been identified. The proponents conduct an interview and research literature and study that can serve as the guide to the development of the system. In this phase, the tools and materials used in development are implemented, including XAMPP, Visual Studio Code, and Canva in the system development. Prototype Cycles. In the next phase, the prototype cycle has been performed. There are three cycles to create a system, including development, demonstration, and refine. The development phase begins with creating a mock-up and prototype that will serve as a guide to the proponents to analyze the whole system and coding process. The next phase in the prototype cycle is the demonstration of the system. The system was first demonstrated to the adviser to check its functionality, features, and design. and recommending some minor changes to the system. Testing. The testing phase will be implemented using the ISO/IEC 25010 standard in System Architecture and Integration II. Which will be distributed to the intended recipients. Deployment. Following the testing phase, the system will be deployed to the intended beneficiaries, who will be tasked with monitoring and analyzing the system.

System Architecture

The peTrace system has two logins: admin and staff. The owner or system administrator has access to the system through the admin login and is in charge of entering data into the system to be stored in the database. Employees or staff can use the Staff log in to enter sales and generate sales reports. The user login screen is where staff and administrators enter their information, such as their name, username, and password. The goal is to ensure that only employees have access to the system. To be able to view and access all current product information and status in Inventory Management.

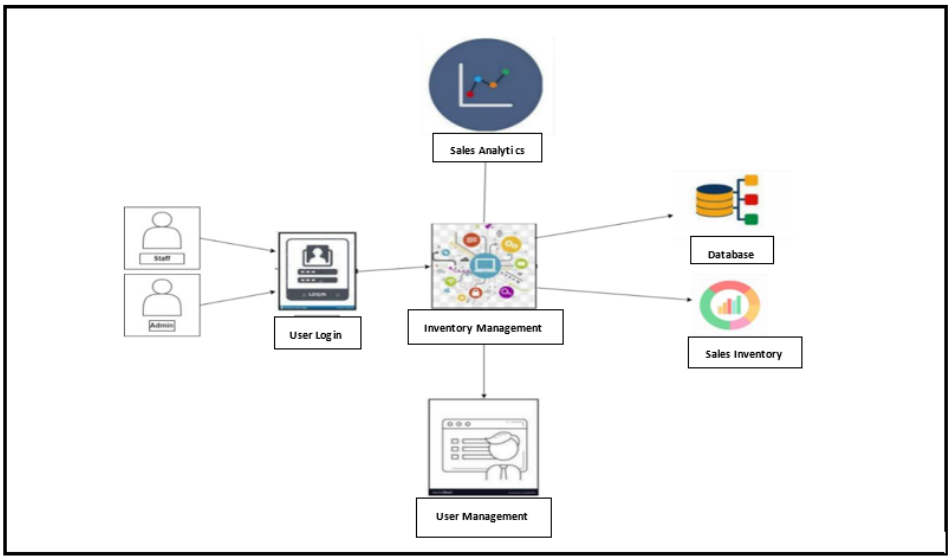

Figure 2: peTrace System Architecture

Data Flow Diagram

peTrace system, has two (2) identities, the staff and admin, and four (4) databases: the staff, categories, products, and sales database. These four databases have relation to each other. Staff Database: In this database, all of the staff information is stored.Categories Database: It stores all the category lists in the Manage Category that the admin can access.Products Database - Manage all of the Product List in the Product Database; the Admin can access the Product Details in this database, and the Staff can access all of the Product Lists in this database.Sales Database: Store all the inventory lists so that the admin can manage the sales.Staff: In this database, the staff can see the staff details in the data store, which is Manage the Staff Information in the Staff Database.Admin: All of the flow in a system that the admin can manage is in the product information that is stored in the product database, in the sales details that are connected to the sales database, and in the inventory list that can manage the sales in Manage Sales.

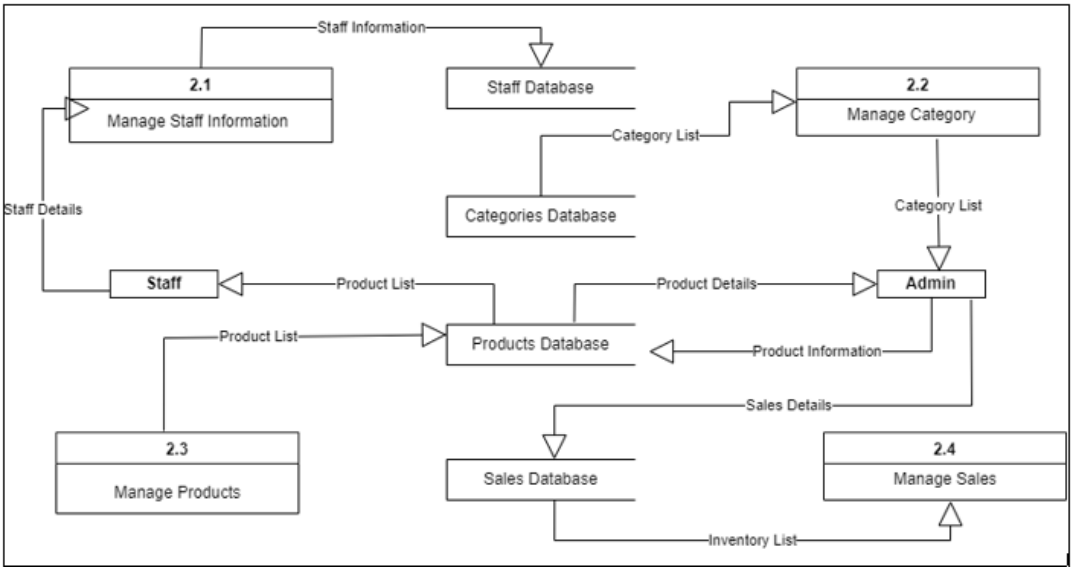

Figure 3: Data Flow Diagram

Context Diagram

The diagram below illustrates the context flow diagram of the developed system. Specifically, the peTrace system provides different features that benefit the admin, staff, and clients.

The system peTrace can show the list of products to staff, including their categories. Staff must provide their information, such as name, username, and password, to access and view the list of products in the system. for the client to know the available products in the store. However, the admin must also provide its information to view the sales and products in the system.

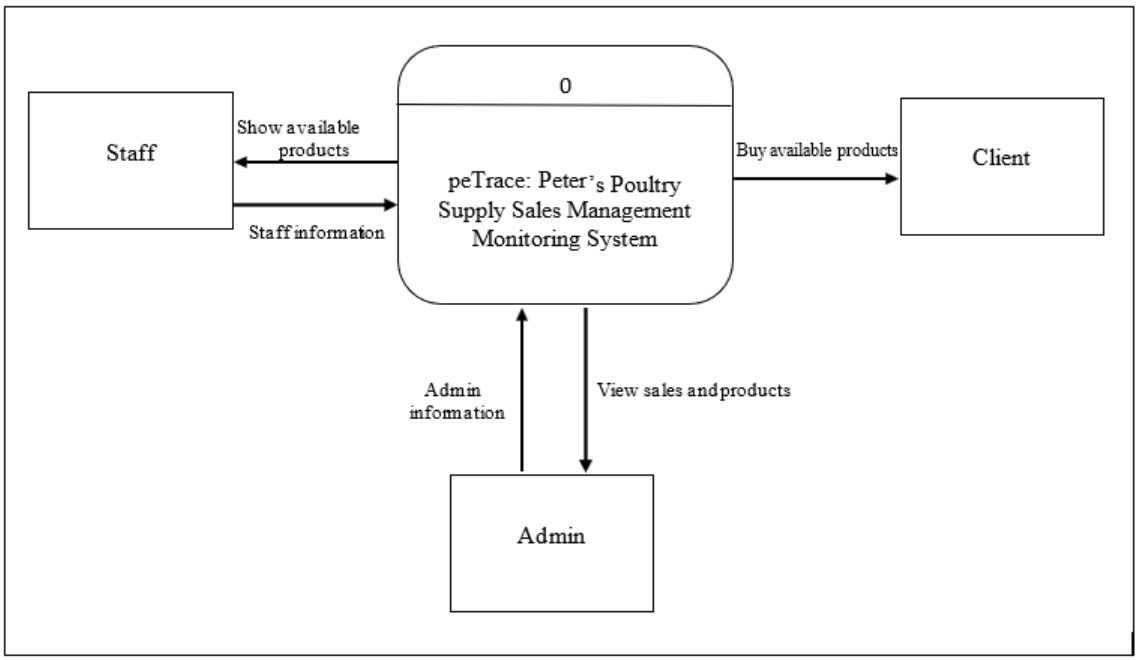

Figure 4: Data Flow Diagram

Use Case Diagram

The figure below illustrates the flow of the system in which the actors had different roles and tasks to perform. The overall functionalities of system configurations were under the control of the administrator. Manage Purchasing Sales – admin and staff control the purchasing of products in-store. With the peTrace system, admin and staff can avoid overstocking the products in the store. Manage Sales Report – manage sales and add sales in the admin and staff areas. Enabling to identify of products that have been added to the store, including their price, quantity, total, and purchase date. Manage Staff Information – information about the staff, such as name, username, password, and user role are incorporated into user management. That enables the staff to log in to the system. Manage Sale Categories – category of the product is listed in the system, and the admin can view the listed category of the product, such as rice, tools, etc., and can also add a new category. Manage Products – system allows admins to add new products and select their categories.

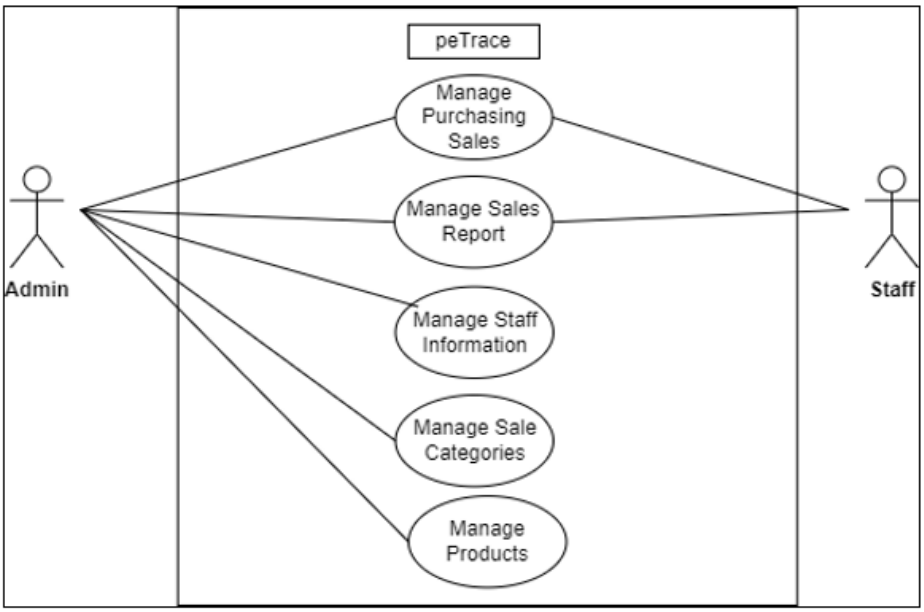

Figure 5: Use Case Diagram

Testing and Evaluation

The proponents performed alpha testing to make sure that the system will function accordingly. This type of testing refines the software system before it is deployed. Following the resolution of various design and functionality issues, the system peTrace was ready for evaluation. The proponents used purposeful sampling to locate the fifty (50) respondents and guarantee that the evaluators could offer a more trustworthy evaluation result. IT professionals, retail owners, and Peter's Poultry Supply employees are among those who responded. They ran through the system several times and tested all of its features. The questionnaire was also based on the ISO 25010 software quality requirements. Were functional appropriateness, performance efficiency, usability, security, and maintainability all evaluated. (Table 1). Other criteria, on the other hand, were omitted since they had nothing to do with the established system. The proponents created indicators for each criterion, which were subsequently validated by the expert.

Table 3: Post-test Performance Result

Criteria	Indicator
Functional Suitability	The system performs its functions as planned.
	Requirement's specification, the system functions properly.
Performance Efficiency	The peTrace system provided a real-time update on admin and staff information.
	The peTrace is capable of processing a big amount of data.
	Even multiple transactions load quickly in peTrace system.
Usability	The peTrace is feasible to use.
	The user interface of peTrace provides a pleasant and engaging engagement for clients.
	The peTrace meets the client's requirements.
Security	The peTrace does not jeopardize the user's personal data. The peTrace offers a way to limit unwanted access to system data.
Maintainability	The peTrace can also apply to other poultry supply business. The peTrace provides a way to detect errors in different portions of the developed system.

RESULTS AND DISCUSSION

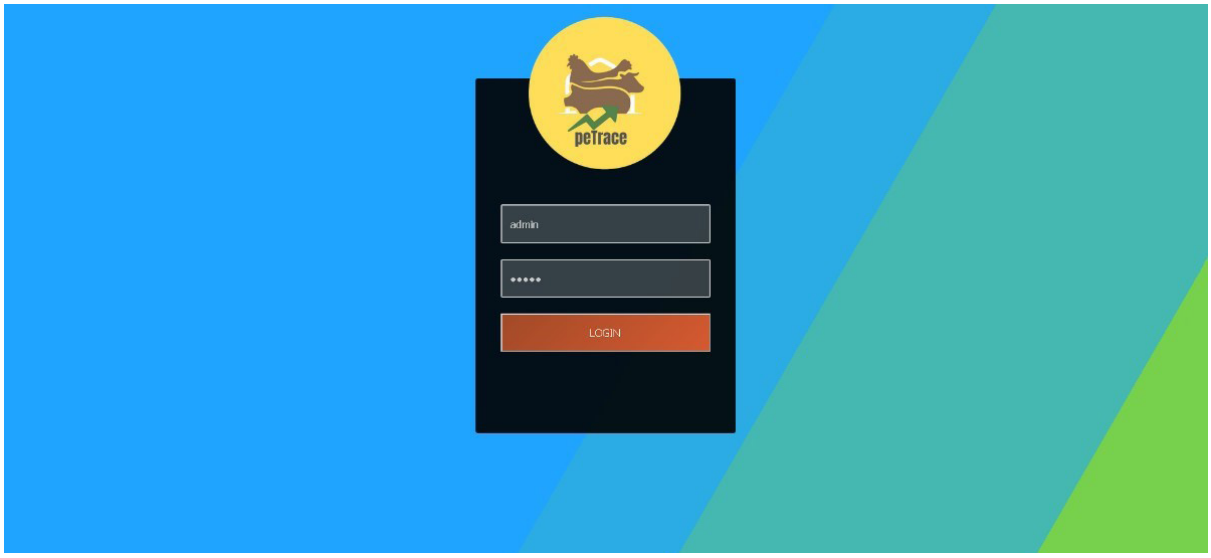

Figure 6: Login Form

The administrator must enter the correct username and password in the provided login form to access the system. The dashboard of the administrator shows the number of users, categories, products, and sales.
It also indicates here the features of the highest-selling products in the store, the latest sales, and the recently added products. Moreover, the system also allows admins to input other information in the fields of user management, categories, products, media files, sales, and sales reports.

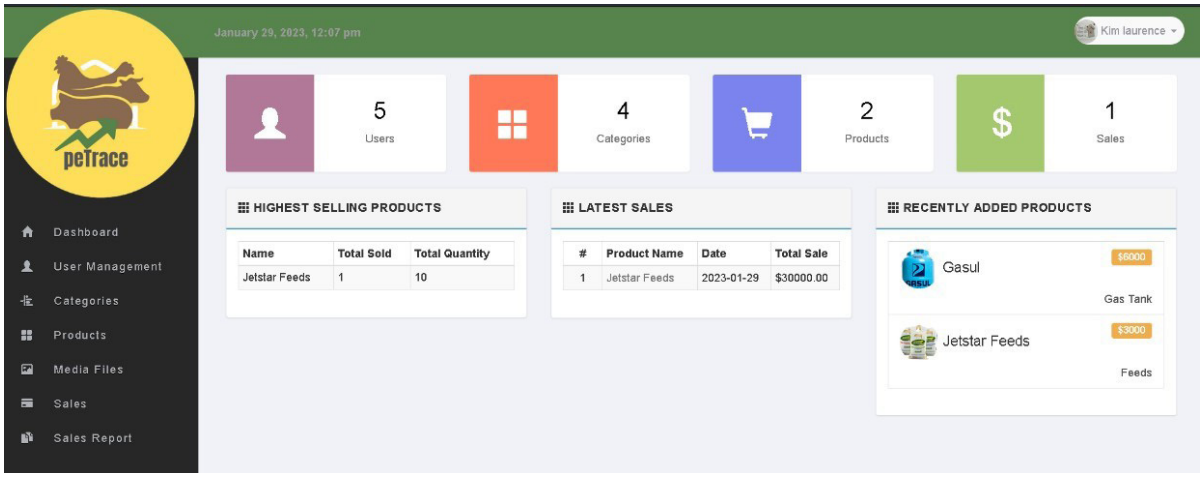

Figure 7: Admin Dashboard

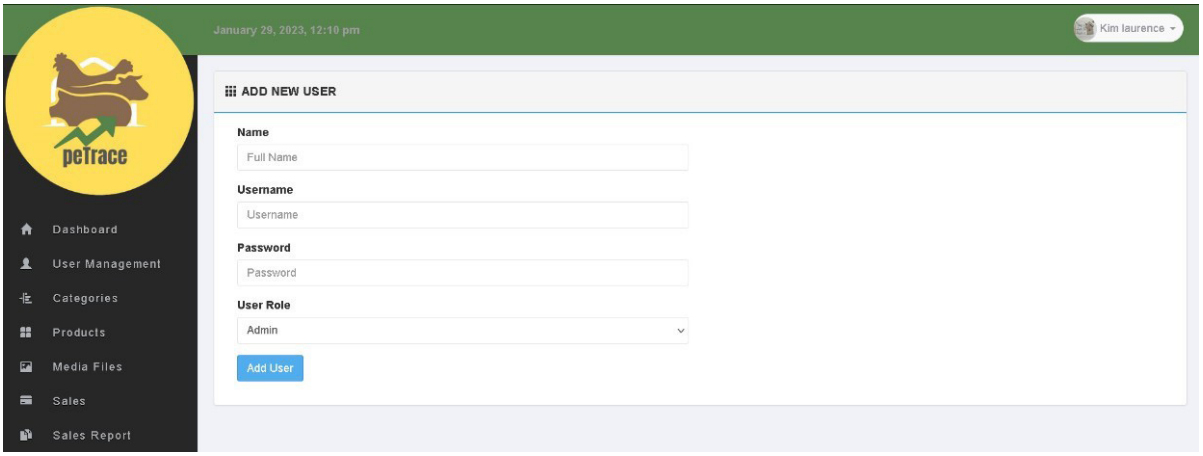

Figure 8: Adding New User

Figure 8 shows the process of adding a new user to the system. It includes here the user's name, username, password, and user role. The user role refers to the position of the staff in the store. And new users will be added to view the products and sales of the store.

The added user in Figure 8 is shown in Figure 9. This incorporates the number of users added, their names, user names, roles, statuses, and the date of their last login.

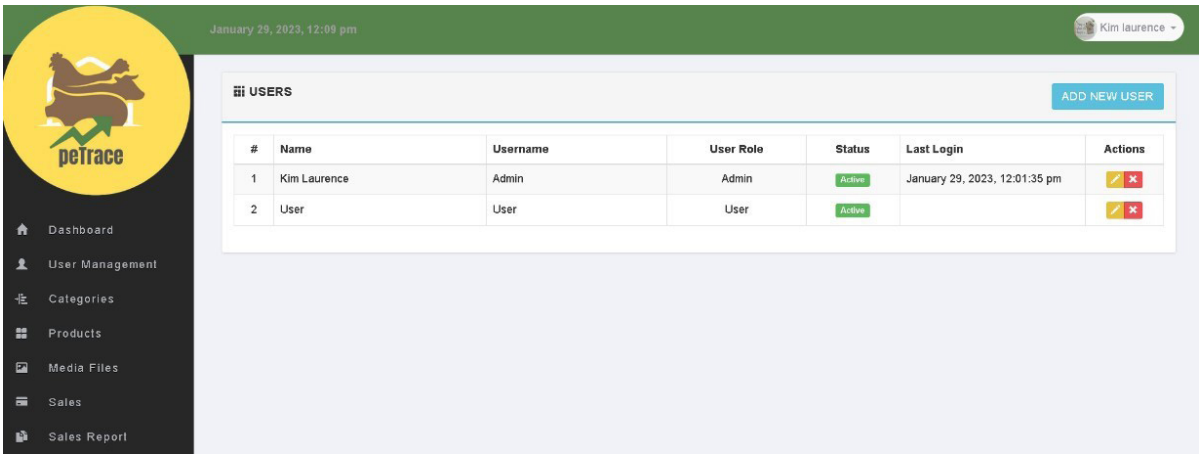

Figure 9: User Account

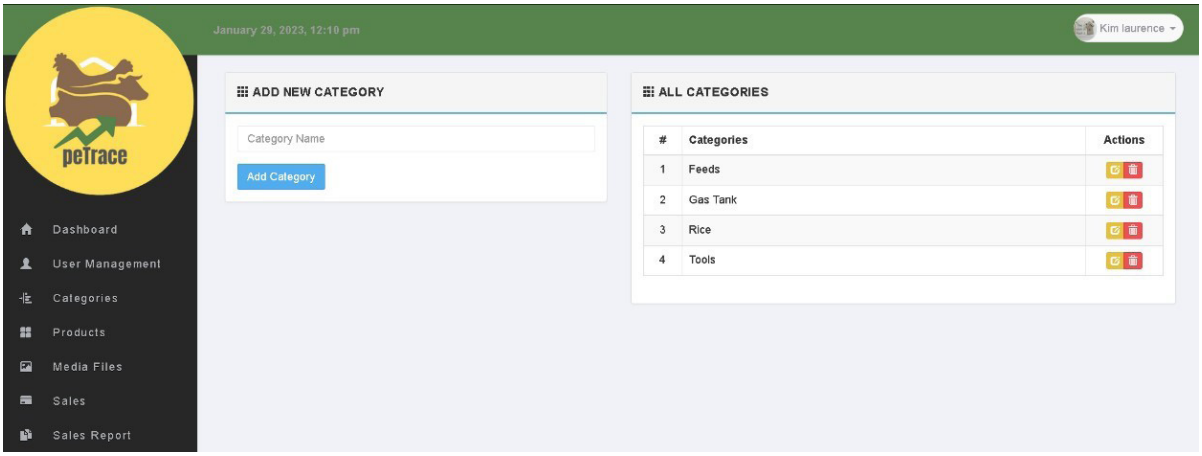

Figure 10: Adding Category and list of Category

The system allows the admin to add product categories. This will help the admin easily locate product lists in the system. Figure 11 shows a form to add a new product to the system, which allows the administrator to choose the category of product, product image, product quantity, buying price, and selling price.

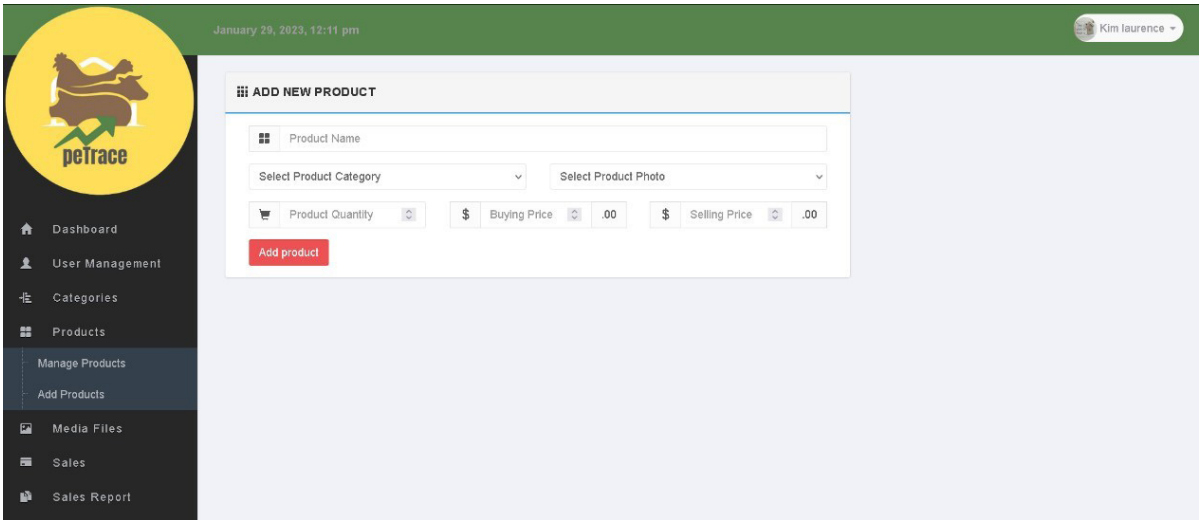

Figure 11: Adding Product

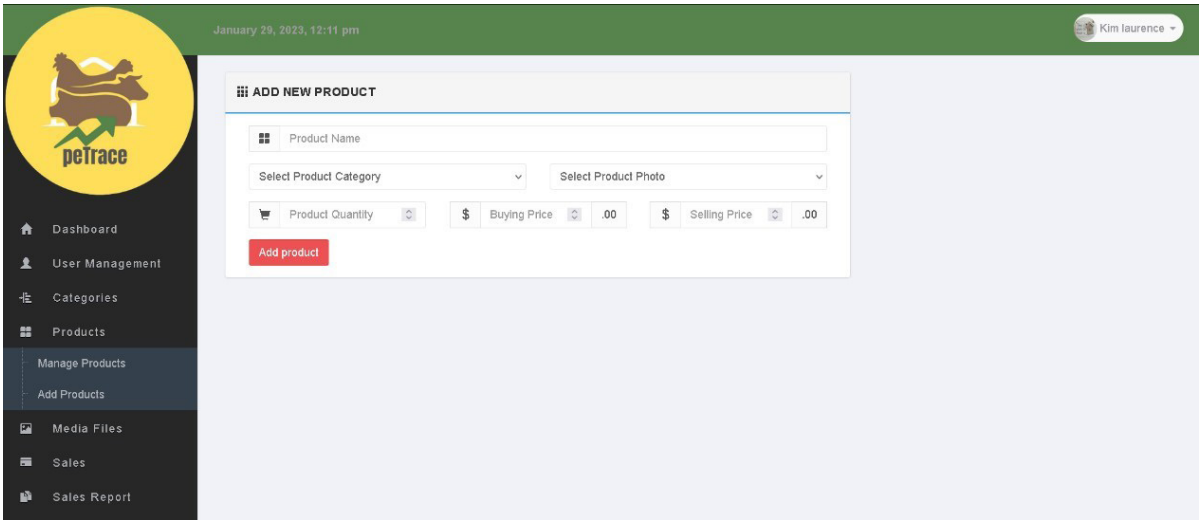

Figure 12: List of Product

The added product is shown on the Product page, which shows the information about the product, such as the product photo, product name, categories, in-stock price, buying price, selling price, date of purchase, and an action (edit or delete).

Figure 13 shows the lists of available products in the store, with product photo, type of image, and the delete action. This falls under the media files that enable admins to upload product images and view image types.

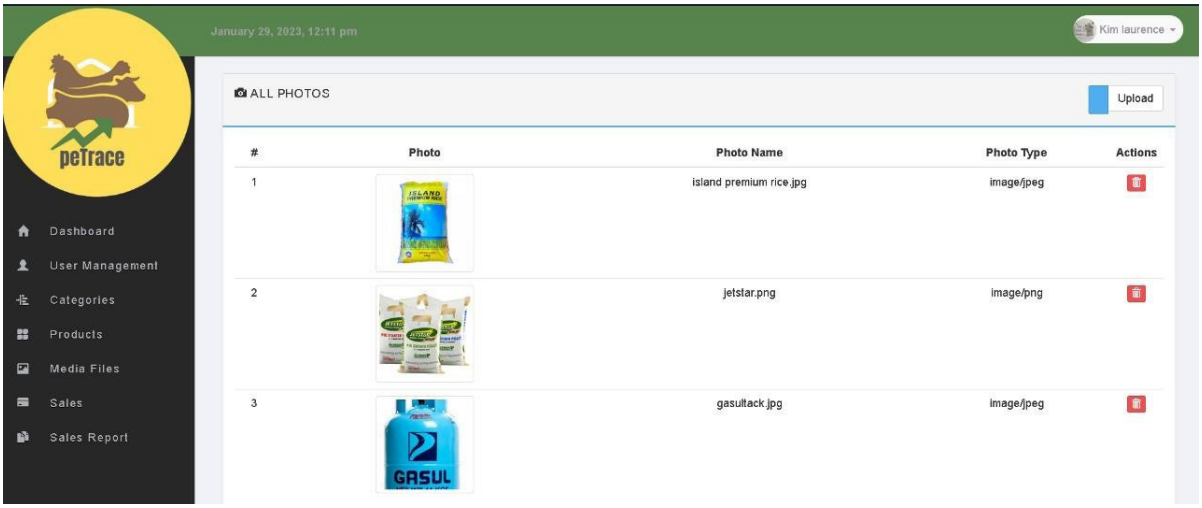

Figure 13: List of available products

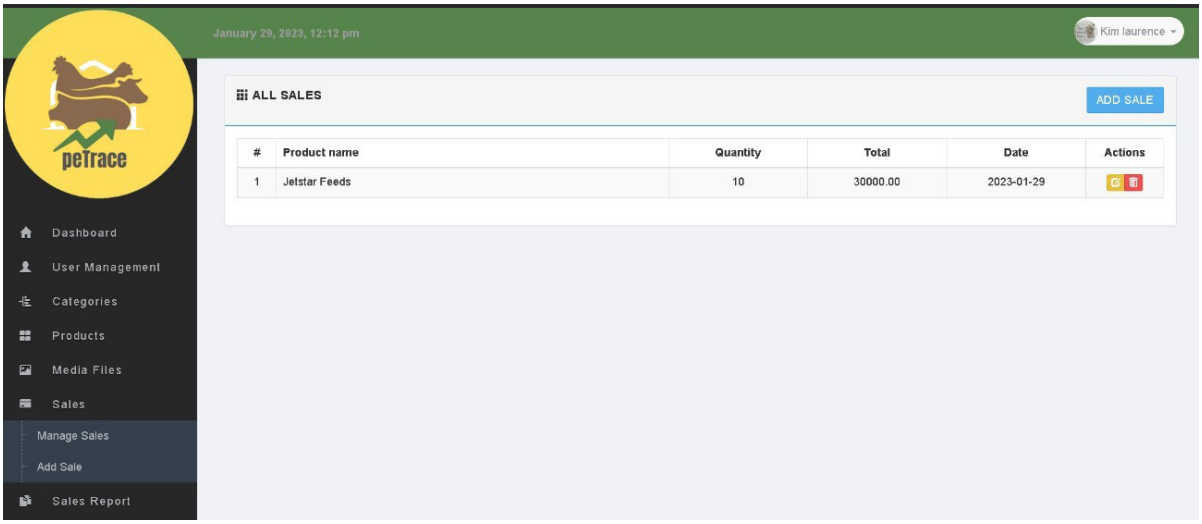

Figure 14: List of All Sales

Under Sales, the menu is the list of sales that displays the product name, product quantity, total, date, and the actions edit and delete. allowing the user to edit the information and delete the listed products.

This part shows the function of the add button in the system, which allows users to add product information under item, price, quantity, total, and date.

The system allows the user to generate a report by

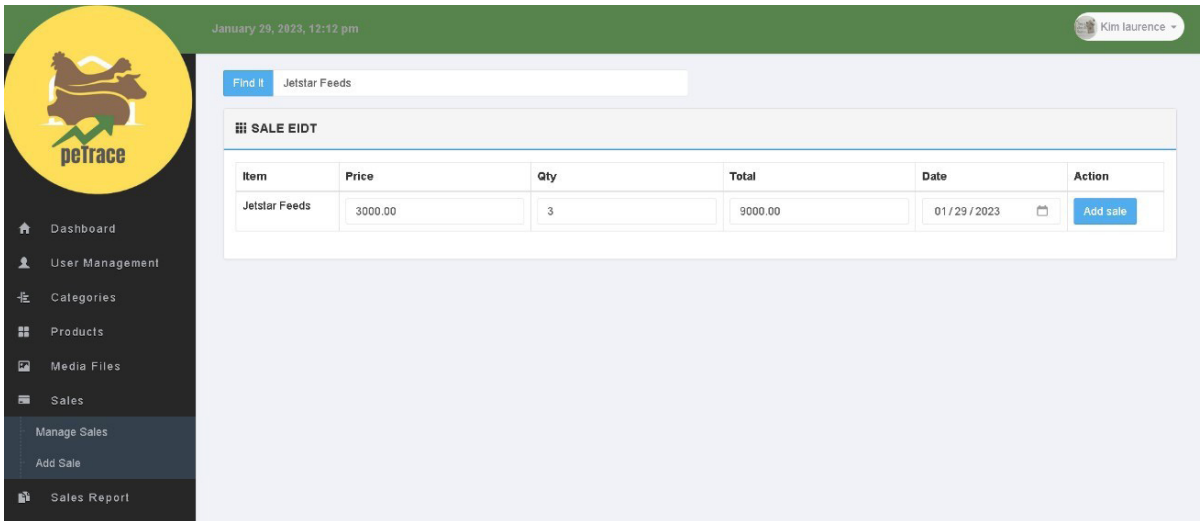

Figure 15: Sales edit fields

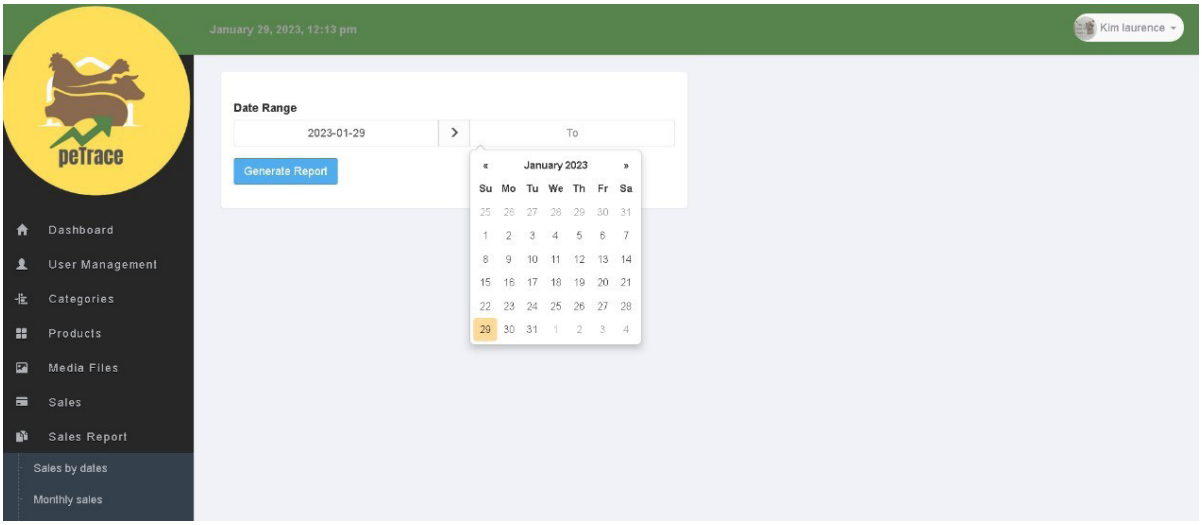

Figure 16: Sales by Dates

inputting the date of sale and the date of purchase. The sales report shows the date of purchase, product name, buying price, selling price, the total quantity of products, and the overall total of products, such as the total, and its profit, enabling printing the sales report of the store in a PDF format.

PeTrace - Sales Report

2023-01-29 TILL DATE 2023-01-29

Date	Product Name	Buying Price	Selling Price	Total Qty	TOTAL
2023-01-29	Jetstar Feeds	2000.00	3000.00	13	39000.00
				GRAND TOTAL	$ 39,000.00
				PROFIT	$13,000.00

Figure 17: Sales Report

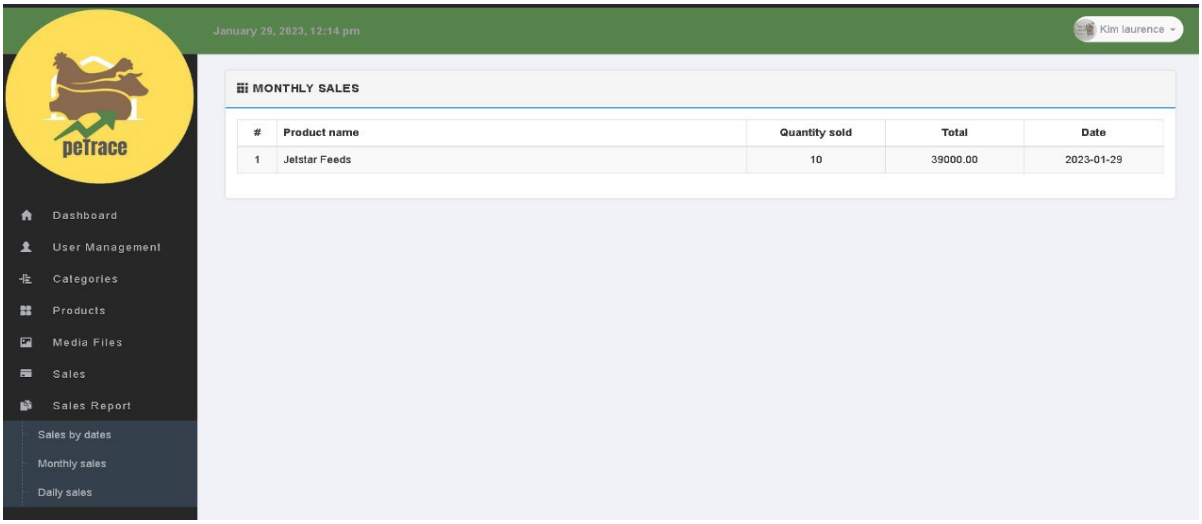

Figure 18: Monthly Sales

Figure 18 shows the monthly sales of the sold products, including their quantity, total, and realtime data.

Figure 19 illustrates the store's daily sales with the products sold, including the quantity and total.

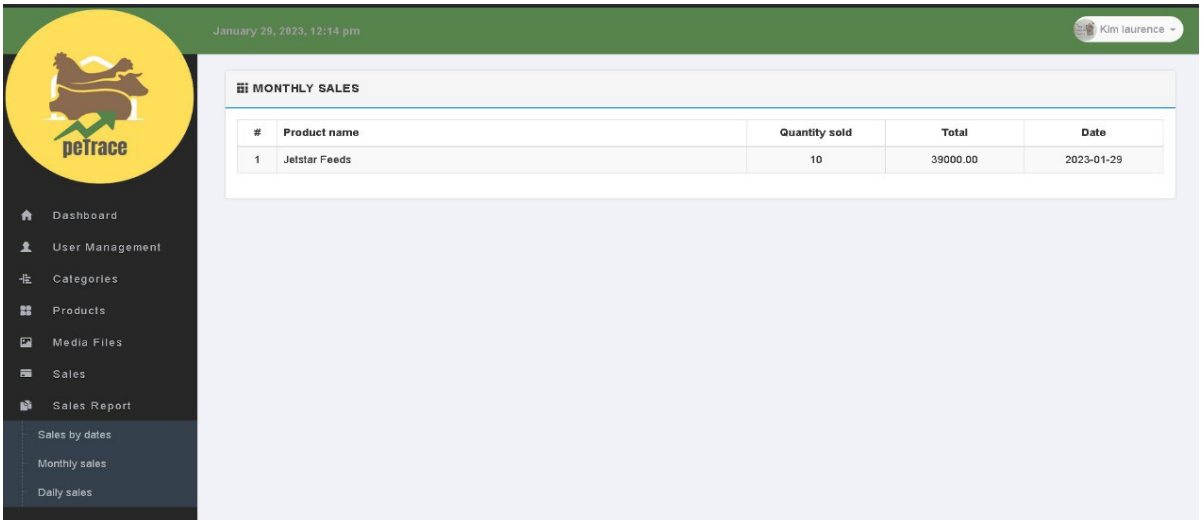

Figure 19: Daily Sales

System Evaluation Result

The peTrace system's functionality applicability is rated as exceptional, with a mean of 4.90, suggesting that system operations are both required and acceptable. The system's performance efficiency shows that it is responsive in real-time, with an average mean of 4.85. (excellent). Usability has a great mean of 4.83, meaning that it is simple to use, entertaining, and fulfilling for the user. Security and maintainability demonstrate that the system peTrace does not put the user's personal information at danger and is adaptable to any feeds storage with a score of 4.82, which is regarded as exceptional.

Table 2. Overview of the system evaluation

Criteria	Mean	Verbal Interpretation
Functional Suitability	4.90	Excellent
Performance Efficiency	4.85	Excellent
Usability	4.83	Excellent
Security	4.82	Excellent
Maintainability	4.831	Excellent

CONCLUSION

According to the ISO 25010 evaluation result, the system, peTrace, is useable and performs as intended. The technique is generic enough that any Feeds Store, particularly in Oriental Mindoro, might implement it. However, the system has flaws, such as the inability

to assess client comments; as a result, for further enhancement, the protagonist recommends applying a real-time analysis to a system that will offer continuous monitoring, without delays, or at least those will be minimal. Alert system once a certain event takes place, a warning will be generated that will reach the indicated people, Notifications, and Status charts.

RECOMMENDATION

peTrace: Peter's Poultry Supply's Management Monitoring System is used to monitor sales at Peter's Poultry Supply, and it helps to keep the record and information of the business that helps staff and employees track the data. Customer information can be saved and used to provide comprehensive sales that are easily accessible. This system is accessible through devices where administrators could add, update, and delete data. It consists of a list of products, their quantities, and their prices. The user enters a password and username to access the transaction process, which includes entering data such as the product name, price, and quantity of the product, in addition to the money obtained from the customer. Every product of the customer will buy will automatically be recorded in the inventory. It was best used in sales monitoring in terms of recording data, computing sales and expenses, managing information, and generating reports from the stored data.

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