

Hup Lee Coffee Trading Management System

Phua Huaysze¹, Noryusliza Abdullah^{1*}

¹ *Fakulti Sains Komputer dan Teknologi Maklumat,*

Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

*Corresponding Author: ai210346@student.uthm.edu.my, yusliza@uthm.edu.my

DOI: <https://doi.org/10.30880/aitcs.2025.06.01.008>

Article Info

Received: 13 June 2024

Accepted: 5 June 2025

Available online: 30 June 2025

Keywords

Coffee Trading Management System,
Web-based system, Document
Control, Order Processing,
Productivity Improvement

Abstract

The Hup Lee Coffee Trading Management System, currently reliant on manual processes, encounters challenges in document control, inventory management, and decision-making inefficiencies. The study proposes developing a web-based coffee trading management system to address these issues, emphasizing efficient order processing, customer management, and reporting. This project aims to enhance inventory management, minimize errors, and optimize operational processes. Conducted at Hup Lee Coffee Trading's primary facility in Selangor, Malaysia, the study involves interactions with key personnel to implement and test the system's modules. The expected outcomes include improved inventory control, real-time reporting for informed decisions, enhanced productivity through efficient document retrieval, and streamlined data search capabilities.

1. Introduction

The Hup Lee Coffee Trading Management System oversees the operations of a coffee shop, focusing on order maintenance and coffee management. Presently, the system relies on manual processes for recording data related to orders, products, customer information, and shipping addresses. However, this manual approach leads to document control challenges, often resulting in lost or difficult-to-track documents and data errors, requiring considerable rectification effort. Inefficiencies in production planning pose further challenges, impacting resource utilization and causing increased costs and delays in meeting customer demands. Hup Lee Coffee Trading plans to transition to an online platform to streamline order processing, customer management, and documentation reporting to combat these issues. This digital transformation aims to enhance system reliability, offer real-time inventory tracking, optimize production processes, and implement quality control measures, thereby boosting efficiency and minimizing errors.

Hup Lee Coffee Trading's current management system grapples with several challenges. Primarily, the system necessitates extensive physical space and time to store paper documents, causing difficulties in tracking, retrieving, and securely storing information. Manual processes lead to potential mishandling of data and lost documents, where human errors such as incorrect orders or misplaced information are common occurrences. Additionally, the system lacks real-time access to accurate and comprehensive data, hindering the ability to make timely decisions, adapt to market changes, and optimize operational processes, resulting in inefficiencies and missed opportunities.

The primary objectives encompass designing and developing a structured coffee trading management system utilizing a web-based approach. The aim is to create a comprehensive system that caters to the needs of managing coffee trading operations efficiently. Furthermore, testing the developed system is crucial to ensure it aligns with user requirements and fulfills their expectations, ensuring its functionality and effectiveness in meeting the intended purposes of the management system.

This is an open access article under the CC BY-NC-SA 4.0 license.



This study centers on devising and implementing a comprehensive Coffee Powder Management System tailored for Hup Lee Coffee Trading, a company engaged in coffee powder manufacturing. The case study specifically focuses on the primary facility situated at 55 Lintang Sungai Keramat 6C Taman Klang Utama 42100 Klang, Selangor, Malaysia, where coffee powder production and inventory management activities are conducted. Throughout this study, interactions with key personnel, encompassing Administration and Staff, are vital. The Administration's role involves developing and testing service recovery procedures within the management system, while Staff members are tasked with order management and product information updates. The module list delineated for the Hup Lee Coffee Trading Management System highlights essential components such as login authentication, customer management, order processing, reporting and analytics, and shipping and delivery information.

The expected outcome for the Hup Lee Coffee Trading Management System is improvements in inventory management, indicating that the system will help reduce the occurrence of stockouts and overstock situations. This is crucial for maintaining a steady supply of products while minimizing storage costs and waste. Besides, the system aims for real-time reporting and analytics for informed decision-making. It will produce real-time reporting and analytics, emphasizing the significance of data-driven decision-making. This tool will enable Hup Lee Coffee Trading to make vital decisions based on current and accurate information. Furthermore, this system will increase productivity and decrease time wasted quickly retrieving documents. Digital document filing allows users to find documents quickly. The system can perform a search by a keyword so that users can extract the specific information efficiently.

2. Related Work

Effective knowledge management and organizational innovation can significantly enhance the coffee production chain. Centralizing coffee farmers in the production process is crucial, as it not only improves their families' living standards but also promotes economic growth within their communities [1]. This enables the identification and exploitation of opportunities, enhances information utilization, and boosts the intellectual capacity of employees, all contributing to business growth in the market. Additionally, it fosters competitiveness and growth by pinpointing factors, models, and tools essential for effective knowledge management[2]. Knowledge management in the coffee processing industry is dedicated to tackling crucial concerns like enhancing environmental conditions and improving the livelihoods of producers. Through an emphasis on sustainable practices, its goal is to foster lasting agricultural development in coffee production. Global coffee production faces a range of risks due to environmental factors like climate change and pest-related impacts, alongside challenges posed by political and economic factors [3]. Moreover, coffee is not just a beloved delicacy in nations with a heritage of cultivating it; its importance in trade also positions the coffee industry as a major player in the global economy.

The increasing demand for coffee both locally and globally has led to extensive production activities across upstream and downstream sectors. However, the socioeconomic effects of this production remain a concern, particularly regarding the social benefits and economic value added for farmers. This study seeks to analyze the social impact of the coffee industry. The coffee industry should adopt enhancement strategies to amplify its social impact across all stakeholders within its business supply chain [4]. In summary, this determined that while coffee producers may not possess advanced technological tools for knowledge management, they do have basic governance processes in place. They view introducing a knowledge management system as potentially advantageous, offering a competitive edge in bolstering coffee production[1].

The implementation of inventory management systems in the coffee supply chain offers significant advantages. By reducing lead times through streamlined processes and real-time inventory visibility, businesses can respond swiftly to customer demands. Improved demand forecasting based on historical data and market trends enables optimal inventory levels, enhancing customer satisfaction and loyalty. However, challenges such as high implementation costs and training needs exist. Despite this, empirical data from coffee cooperatives demonstrate a 20% reduction in inventory holding costs post-implementation [5]. This reduction directly impacts profitability by cutting expenses associated with excess inventory. Overall, inventory management systems prove transformative, boosting efficiency, customer service, and cost savings while requiring strategic management of initial challenges for long-term success.

According to Leerojanaprapa [6], inventory management is crucial for businesses and supply chains, impacting profits and cash flow, which are major assets. Excessive or insufficient inventory can lead to business failures. Hence, top management must closely monitor inventory. With diverse demands and rapidly changing customer behaviors, companies serving fast and cost-effectively gain marketplace advantages. Swink categorized inventory into two types: production inventory comprising raw materials, parts, and components for production,

and work-in-process and semi-finished products [7]. Finished goods inventory, the final type, is the focus of distribution centers and includes items ready for sale or reserved for customers, belonging to the company [8]. Inventory serves not just customer demand but also as safety or buffer stock, exceeding normal levels to address demand uncertainty or lead times. Literature suggests that a firm's strategic decisions affect both inventory levels and financial performance concurrently [9].

Warehouses typically serve as storage spaces for goods and products. However, locating specific items within warehouses can be challenging, as users often need to conduct manual searches across all available stockrooms, requiring considerable effort. To address this issue, a warehouse inventory management system proves invaluable. It centralizes detailed product information and provides precise location data, facilitating efficient tracking of products and eliminating the need for extensive manual searches [10].

Inventory management encompasses various types of stock, each serving specific organizational functions [11]. Raw materials are the foundational materials procured from suppliers and held until needed for production. Work in progress includes products actively being worked on in the production or assembly phase [12]. Spare parts are essential for equipment maintenance, while consumables include daily necessities like stationery [13]. Additionally, stock can be categorized by purpose, with cycle stock representing standard operational inventory and safety stock serving as an emergency reserve. The choice of stock classification depends on individual organizational needs and objectives, aiming to ensure smooth and efficient operations.

A database refers to an organized collection of information stored in a computer system, accessible via computer programs for data retrieval. In institutions like LAPAN, vast amounts of observational data are typically stored on CDs or hard drives. However, the arrangement of data on these storage mediums can often seem random or arbitrary, leading to challenges in data management, particularly with substantial data volumes. The database structure is designed for simplified searches and retrieval to streamline data retrieval and ensure faster access to specific information within the database. Without proper control of databases or raw data, retrieving information from various equipment sources becomes exceedingly complex and time-consuming [14].

Web-based systems provide universal access through web browsers, enabling users to access applications from anywhere, anytime [15]. This means that authorized users, including administrators, staff, and other relevant parties, can log in and utilize the system from virtually anywhere in the world. Whether it is the office, a coffee supplier's location, or a remote coffee farm, access is universal. This level of accessibility eliminates geographical limitations and facilitates the smooth operation of the coffee trading business across various locations.

Developing web-based systems can be more cost-effective than traditional software, as they eliminate the need for individual installations and updates [16]. Traditional software often requires updates to be deployed individually on each user's device. This process can be time-consuming and resource intensive. In contrast, a web-based system allows for centralized updates and maintenance. When updates or improvements are implemented, they are applied to the server, instantly benefiting all users. This not only saves time and effort but also ensures that everyone is consistently using the latest and most secure version of the system.

Web-based systems can easily integrate analytics tools for data-driven decision-making, offering insights into user behavior and system performance [17]. For a coffee trading business, maintaining the quality of products is paramount. Data analytics can be applied to monitor quality control parameters and identify potential issues in the supply chain. This proactive approach ensures that only the highest-quality coffee reaches customers, reducing the likelihood of returns and enhancing the brand's reputation.

Research was undertaken to compare the existing similar system with the proposed system, and the summarized results are presented in Table 1. While this web-based pre-viva assessment system shares some modules with the compared systems, the primary emphasis of the project system centers around the assessment system.

Table 1 *System's Comparison*

| System/Features | Odoo Inventory Management System | Zoho Inventory Management System | Sortly Inventory Software System | Hup Lee Coffee Trading Management System |
|-----------------------|----------------------------------|----------------------------------|----------------------------------|--|
| Login | √ | √ | √ | √ |
| Inventory Management | √ | √ | √ | √ |
| Customer Management | √ | √ | √ | √ |
| Reporting & Analytics | √ | √ | √ | √ |
| Web-based | √ | √ | X | √ |
| User Permission | X | X | √ | √ |
| Shipping & Delivery | X | X | X | √ |
| Order Processing | X | X | X | √ |
| Product Management | X | X | X | √ |
| Supplier Management | √ | X | √ | X |
| E-commerce | √ | X | √ | X |

3. Methodology

3.1 Waterfall Model

Prototyping model is an iterative systems development approach where a prototype is constructed, tested, and refined iteratively until reaching an acceptable outcome, serving as a basis for developing the final system or product [18]. This model works best when only some project requirements are detailed beforehand. This is an iterative, trial-and-error process that occurs between developers and users. The Project Methodology guides the information system development process by outlining steps for formation, control, and planning. It incorporates software process models, project planning, and software/hardware requirements to efficiently execute the System Development Life Cycle (SDLC). The chosen Waterfall Model, a blend of iterative and incremental processes, structures the development into five phases within each iteration: requirements analysis, system design, implementation, testing, deployment, and maintenance as shown as Figure 1. Each phase is completed before advancing to the next, enhancing SDLC progress and efficiency [19].

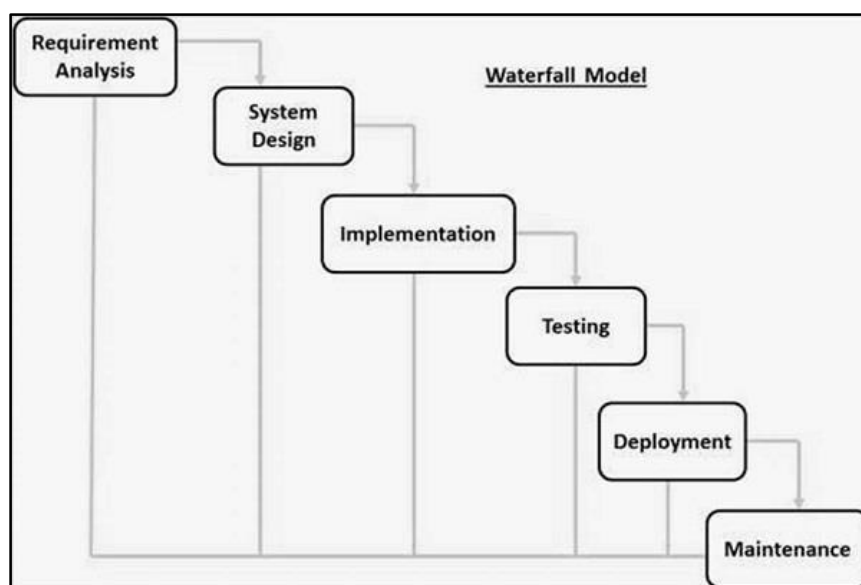


Fig.1 Waterfall Model

3.2 System Development Workflow

The prototype model contains a total of five stages. Each phase has its own assignment and output that must be created during the project development process, as shown in Table 2. Aside from that, the output is completed within the required time limit.

Table 2 *Software development activities and task*

| Phase | Task | Output |
|----------------------|--|--|
| Requirement Analysis | <ul style="list-style-type: none"> ▪ Identify scope of the system ▪ Collect user requirements ▪ Collect system requirement for software and hardware | <ul style="list-style-type: none"> ▪ Scope ▪ Project objectives ▪ Interview ▪ Functional and non-functional requirement ▪ Develop Gantt chart |
| System Design | <ul style="list-style-type: none"> ▪ Discuss functions in the system ▪ Discuss and design the function proposed system ▪ Discuss the architecture of the system | <ul style="list-style-type: none"> ▪ Context Diagram ▪ Data flow diagram ▪ Entity relationship diagram ▪ Wireframes diagram |
| Implementation | <ul style="list-style-type: none"> ▪ Create coding by translating design documents into real system development. | <ul style="list-style-type: none"> ▪ Prototype of the system |
| Testing | <ul style="list-style-type: none"> ▪ Test the proposed system ▪ Correction on proposed system | <ul style="list-style-type: none"> ▪ Alpha and Beta testing |
| Deployment | <ul style="list-style-type: none"> ▪ Deploy the system into the production environment | <ul style="list-style-type: none"> ▪ Successful deployment of the system into the production environment |
| Maintenance | <ul style="list-style-type: none"> ▪ Provide ongoing support and maintenance to the system | <ul style="list-style-type: none"> ▪ Regularly updated and maintained system ▪ New features |

4. Analysis and Design

4.1 System Requirement Analysis

System Requirement Analysis concentrates on identifying and documenting the needs and constraints of the entire system. It encompasses technical, functional, and non-functional aspects required for the system to operate, considering hardware, software, databases, interfaces, and more. The functional and non-functional requirements will be delineated in the subsequent section.

4.1.1 Functional Requirements

These requirements outline the specific functionalities, capabilities, or actions that a system must perform to meet the needs of its users or stakeholders. They define the behavior and features of the system. Table 3 shows the functionality requirements of Hup Lee Coffee Trading Management System.

Table 3 *Functional Requirements*

| Modules | Description |
|-----------------------|---|
| Login | Implement Permission-based Access Control (PBAC) to define the actions that each user can perform on specific resources. |
| Customer Management | Create a database to store customer information, including names, locations, and contact details. |
| Product Management | Record and store product types in the database for efficient inventory management. |
| Order Processing | Enable staff to enter customer orders, specifying products, quantities, and delivery details. |
| Reporting & Analytics | Generate various reports, including product reports, order reports, delivery reports, and performance analytics. Present data using charts, graphs, or tables for better understanding. |
| Shipping & Delivery | Enables Staff to schedule deliveries and update delivery status. |
| User Management | Manage user accounts and permissions, including creating, modifying, and deleting user profiles. |

4.1.2 Non-Functional Requirements

Non-functional requirements describe the attributes or characteristics that define the system's operation, usability, security, performance, and other quality aspects. They specify how the system should behave, rather than what it should do. Table 4 shows the non-functionality requirements of Hup Lee Coffee Trading Management System.

Table 4 *Non-functional Requirements*

| Modules | Description |
|----------------|--|
| Scalability | The system should be scalable to accommodate future growth in data volume, users, and functionalities without significant architectural changes. |
| Reliability | Ensure the system's stability and availability, minimizing downtime and system failures. |
| Usability | Ensure an intuitive user interface and user experience, facilitating ease of use and reducing the learning curve for new users. |
| Performance | The system should maintain responsiveness even during peak load times, ensuring quick response times for user interactions. |

4.2 User Requirement Analysis

The project needs to collect, gather, and analyze information, such as specific functionalities, features, and interfaces that users expect to see in the system. User requirement analysis emphasizes understanding and documenting the needs of the end-users or stakeholders who will interact directly with the system. Therefore, an interview session with the manager of Hup Lee Coffee Trading Sdn. Bhd. is a must to collect the information and requirements clearly and specifically. In addition, an existing model has been developed in context diagram, DFD, ERD, and wireframe.

4.2.1 DFD Context Diagram

Data Flow Diagram (DFD) is a graphical representation used to visualize data flow within a system or process. DFDs are commonly employed in systems analysis and project documentation to illustrate how data moves through a system, how it is processed, and how it is stored or utilized by different components or processes within that system. Figure 2 illustrates the Data Flow Diagram Context Diagram (DFD CD) of the management system.

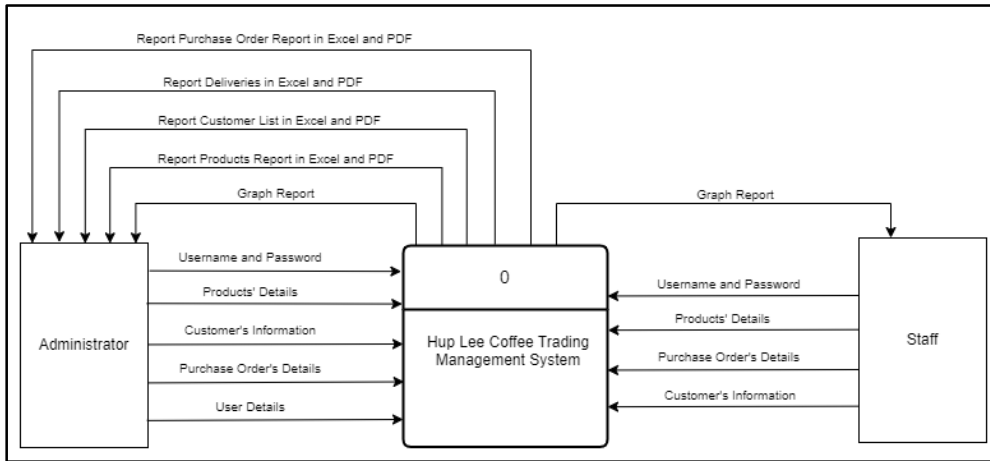


Fig.2 Data Flow Diagram Context Diagram (DFD CD)

4.2.2 DFD Level 0

The level 0 Data Flow Diagram (DFD) elaborates on the CD, offering a detailed breakdown of individual processes involving data stores and external entities. Figure 3 shows the DFD Level 0 of the entire system. It describes the system's main processes, data stores, and data flows but does not provide insight into the inner workings of these processes.

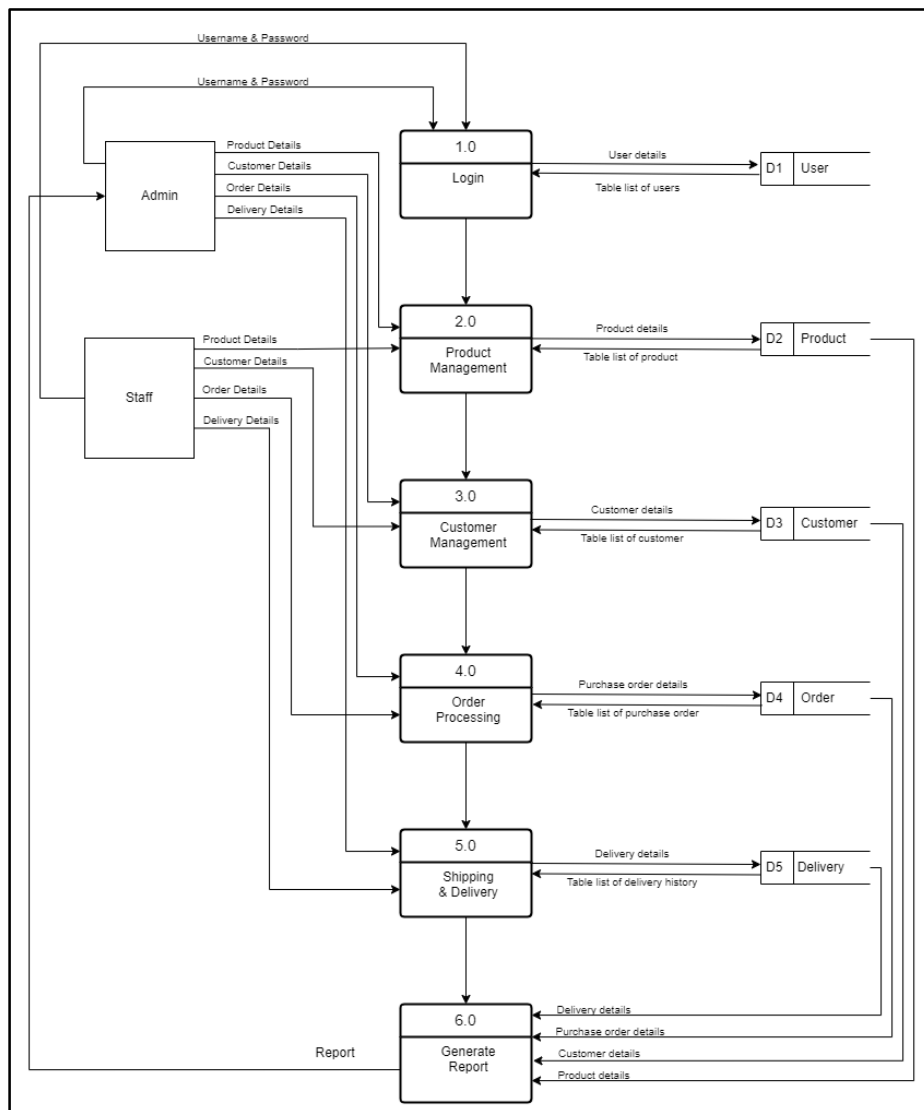


Fig.3 Data Flow Diagram (DFD)

4.2.3 Entity Relationship Diagram

An Entity-Relationship Diagram (ERD) is a visual representation that illustrates the entities within a system and the relationships between those entities. It is a modelling technique used in database design to demonstrate the logical structure of a database. Figure 4 shows the Entity-Relationship Diagram (ERD).

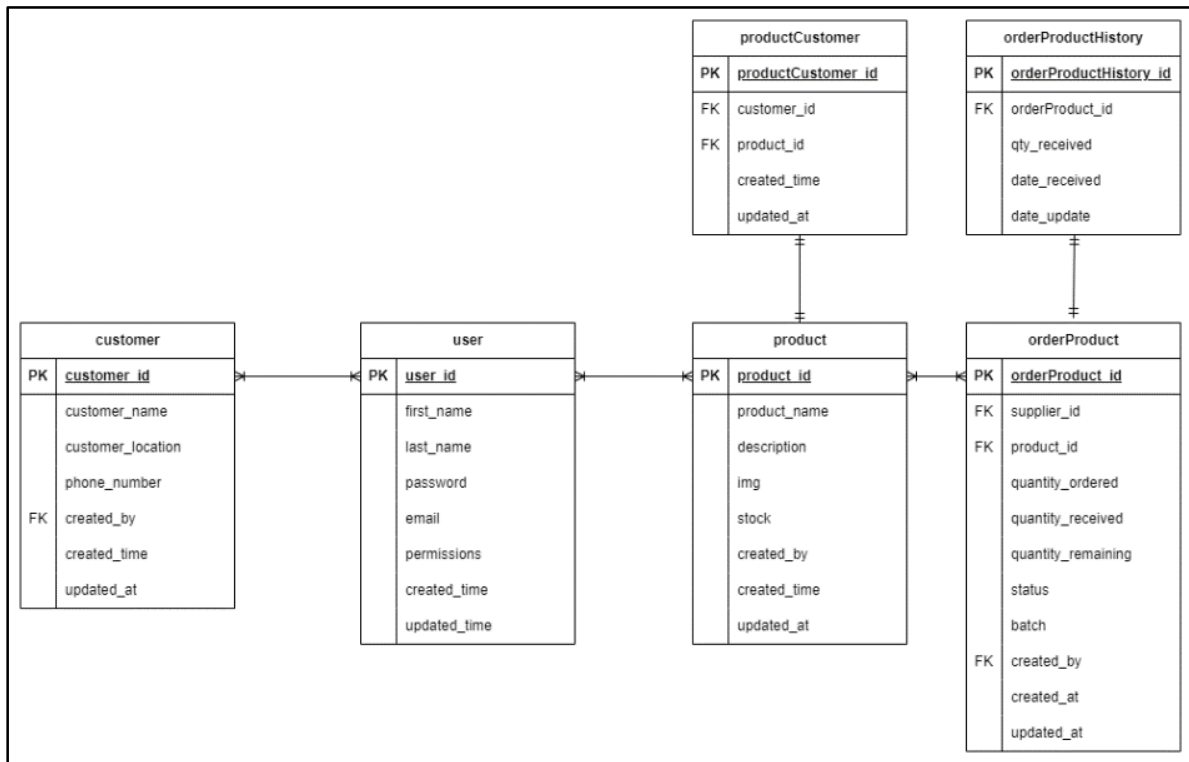


Fig.4 Entity-Relationship Diagram (ERD)

5. Result and Testing

5.1.1 Result Prototype

The Hup Lee Coffee Trading Management System is an online portal-based system designed. It is a web-based system developed using Visual Studio Code, with the database managed through phpMyAdmin. The design and functionality is implemented to create a cohesive and intuitive user experience. Figure 5 shows the homepage of the system. The information, such as contact details, location, and business hours, are listed on the page.

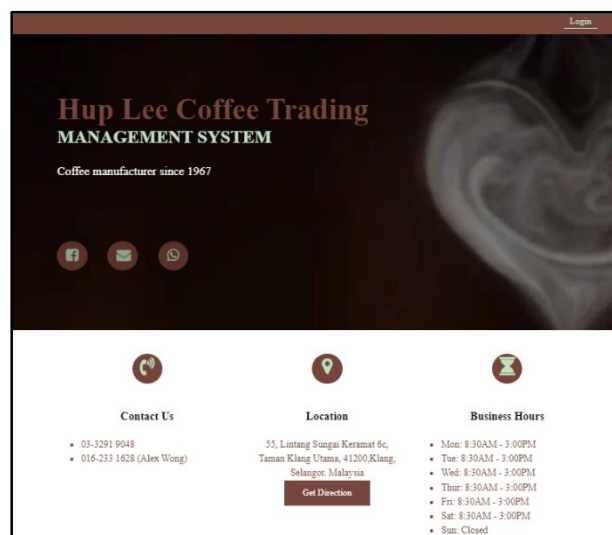


Fig.5 Homepage interface

Figure 6 displays the login page of the system, where administrators or staff members can access the system by entering their unique username and password. This login process is a security measure, ensuring that only authorized personnel can access the system's functionalities. Upon successful login, users are granted access to specific features and data based on their assigned roles and permissions.

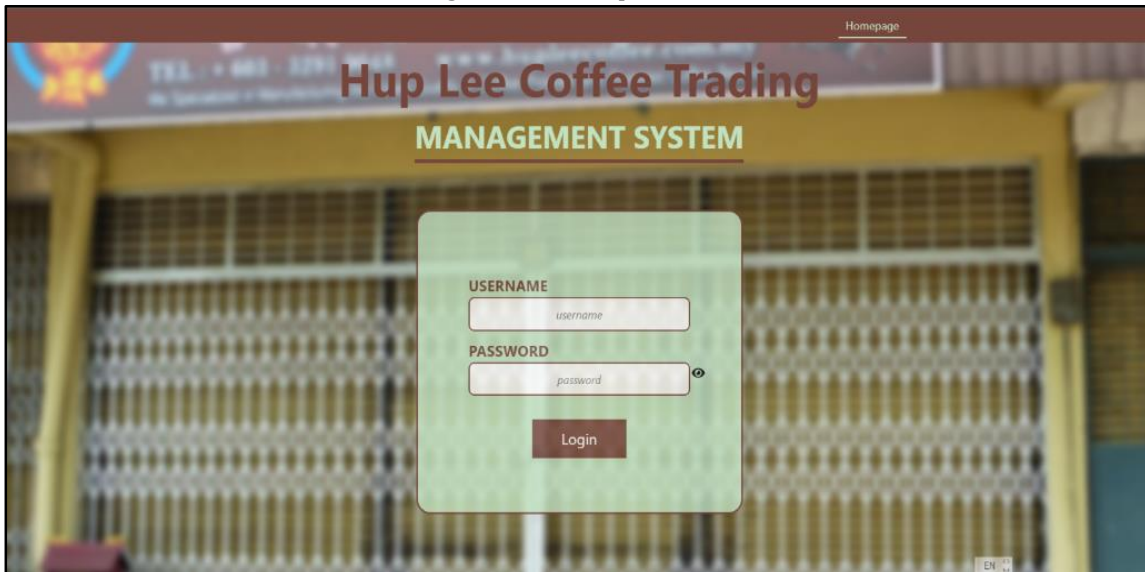


Fig.6 Login interface

Figure 7 shows the system's dashboard interface with an analytics graph. The purpose of including an analytics graph on the dashboard is to offer users a quick and easy-to-understand overview of important data trends or patterns. By visually representing data through graphs, charts, or diagrams, the dashboard helps users quickly assess the current status of the system or business operations without the need to delve into detailed reports.

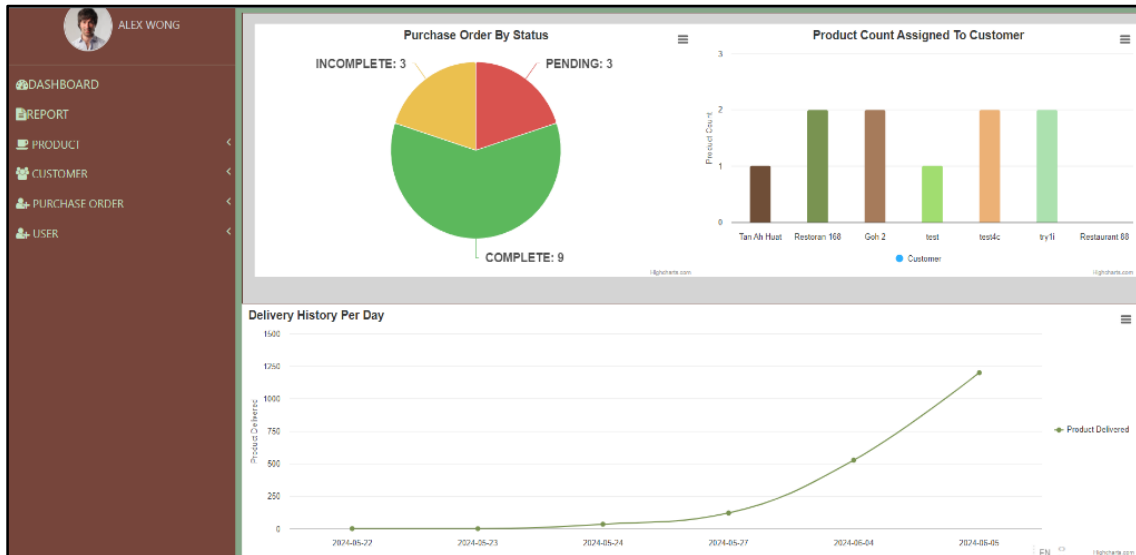


Fig.7 Dashboard interface

Figure 8 shows the report form interface at the Admin site. Admin can generate reports for categories of product, customer, delivery, and order. These reports are valuable for decision-making, performance analysis, identifying trends, and improving operational efficiency within the business. There are two types of report formats, which are Microsoft Excel and Portable Document Format (PDF).



Fig.8 Report interface

Figure 9 presents the report format within Excel, showcasing how data is organized, structured, and presented in a spreadsheet format. Excel is a popular software tool used for data analysis, reporting, and visualization.

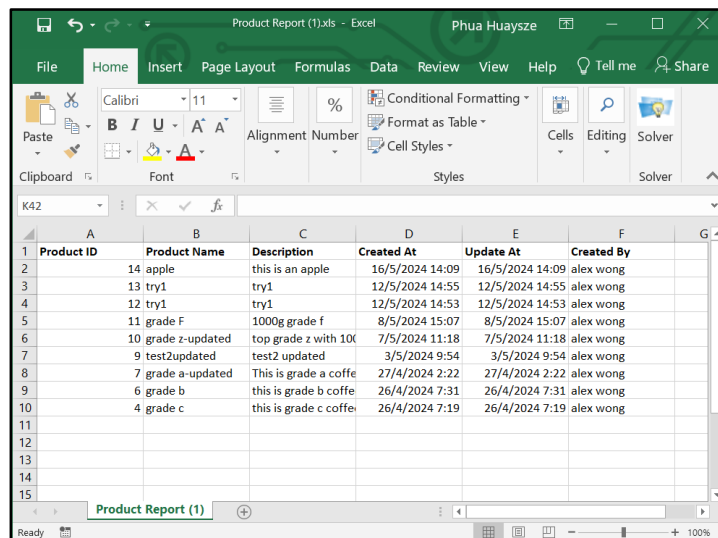


Fig.9.Excel Report Format

Figure 10 illustrates the report format in PDF, which is a widely used file format for presenting and sharing documents in a consistent and secure manner.



| ID | Image | Product Name | Stock | Created By | Created Time | Updated At |
|----|---|--------------|-------|------------|--------------------------|--------------------------|
| 14 | No Image | apple | 1,504 | alex wong | Mar 17, 2024 08:43:13 AM | Mar 17, 2024 08:43:13 AM |
| 13 |  | try1 | 20 | alex wong | Mar 17, 2024 08:43:13 AM | Mar 17, 2024 08:43:13 AM |
| 12 |  | try1 | 4 | alex wong | Mar 17, 2024 08:43:13 AM | Mar 17, 2024 08:43:13 AM |
| 11 | No Image | grade F | 624 | alex wong | Mar 17, 2024 08:43:13 AM | Mar 17, 2024 08:43:13 AM |

Fig.10 PDF Report Format

Figure 11 illustrates the add product interface, providing users with a structured form or interface to input and add new products to the system's database. Product information such as product name, description, customer, and product image are recorded in the system.

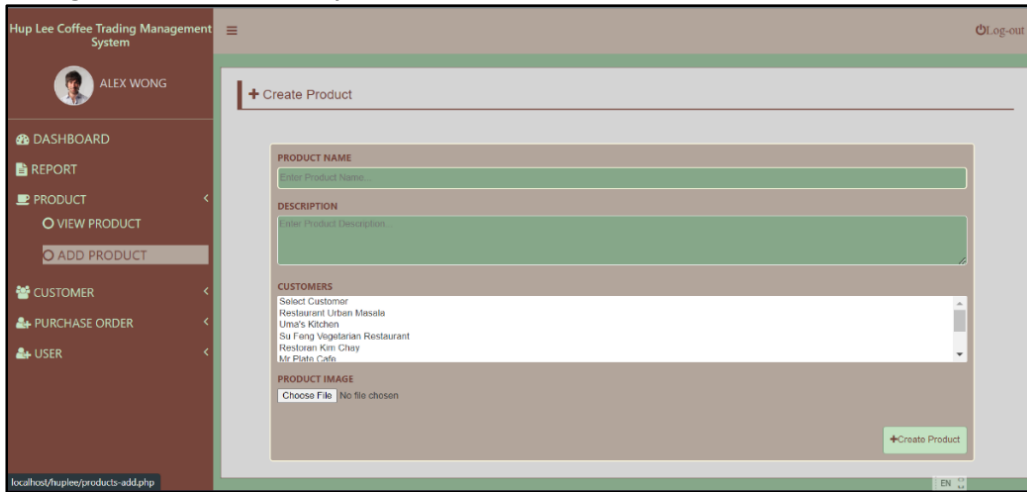


Fig.11 Add Product interface

Figure 12 shows the list of product interfaces. This list likely includes a comprehensive overview of all products available in the system's database, organized in a structured format for easy reference and management.

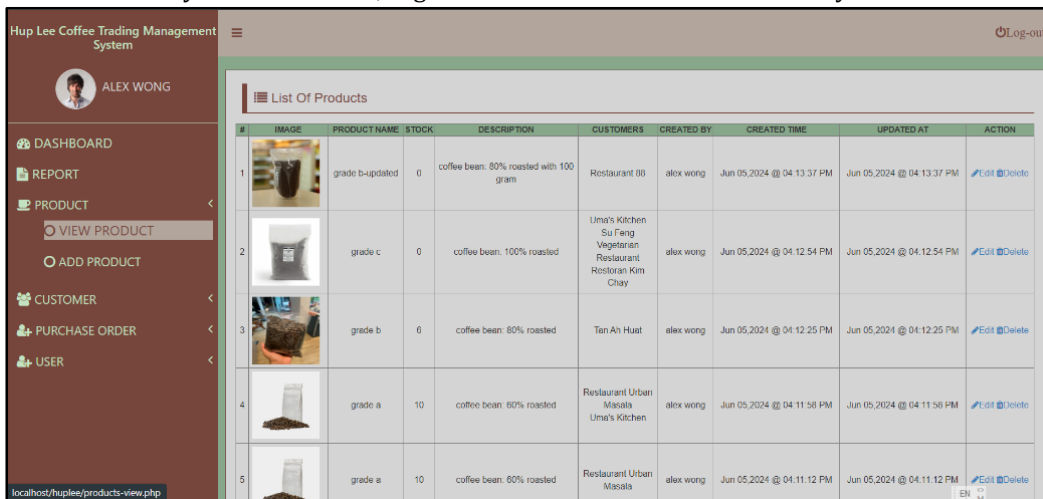


Fig.12 List of Product interface

By clicking the edit button in the action column, Figure 13 illustrates the update product interface, providing users with a structured form or interface to modify and update existing product information in the system's database.

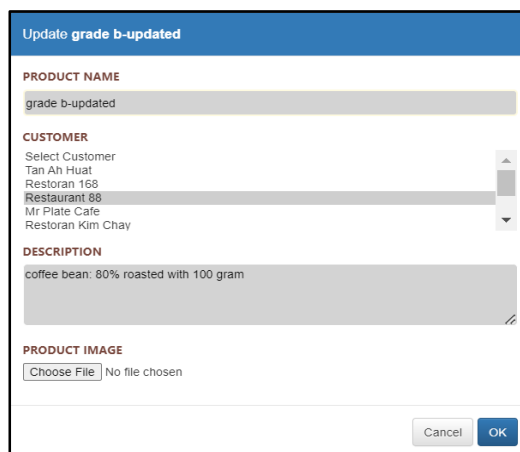


Fig.13 Update Product Information interface

Figure 14 illustrates a detailed view of the customer creation process within the system. It offers users a structured and user-friendly form or interface specifically designed for inputting and storing customer information in the database.

Fig.14 Add Customer interface

Figure 15 shows a comprehensive overview of all customer records stored in the database, offering users a centralized and organized view of customer information. The list of customers typically includes essential details such as customer names, location, and contact information. The product is to be assigned to the customer, and that data is saved by which staff will be recorded.

| # | CUSTOMER NAME | CUSTOMER LOCATION | CONTACT DETAILS | PRODUCT | CREATED BY | CREATED TIME | UPDATED AT | ACTION |
|---|-------------------------------|--|-----------------|---------------------|------------|----------------------------|----------------------------|-------------|
| 1 | Restaurant Urban Masela | 11G, Jalan Mahkota 1, Mullars Bukit Raja 2, 41050 Klang, Selangor | +6011 | grade a grade a | alox wong | Jun 05, 2024 @ 04:07:59 PM | Jun 05, 2024 @ 04:07:59 PM | Edit Delete |
| 2 | Uma's Kichen | Jalan Dato Yusuf Shahbudin 29, Taman Sentosa, 41000 Klang, Selangor | +0102293102 | grade a grade c | alex wong | Jun 05, 2024 @ 04:07:17 PM | Jun 05, 2024 @ 04:07:17 PM | Edit Delete |
| 3 | Su Feng Vegetarian Restaurant | 12, Jalan Dato Yusuf Shahbudin 28, Taman Sentosa, 41200 Klang, Selangor | +00351825678 | grade c | alox wong | Jun 05, 2024 @ 04:06:42 PM | Jun 05, 2024 @ 04:06:42 PM | Edit Delete |
| 4 | Restoran Kim Chay | No. 1 & 3, Lorong Dato Yusuf Shahbudin 29a, Taman Sentosa, 41200 Klang, Selangor | +0102633901 | grade c | alex wong | Jun 05, 2024 @ 04:06:14 PM | Jun 05, 2024 @ 04:06:14 PM | Edit Delete |
| 5 | Mr Plate Cafe | Batu Pahat, Johor | +0109519679 | - | alox wong | Jun 05, 2024 @ 04:03:50 PM | Jun 05, 2024 @ 04:03:50 PM | Edit Delete |
| 6 | Restaurant 88 | Pelaling Jaya, Selangor | +0103389457 | grade b- updated | alex wong | Jun 05, 2024 @ 07:08:16 AM | Jun 05, 2024 @ 07:08:16 AM | Edit Delete |
| 7 | Goh | Tanjung Sepak | +0102293161 | - | alox wong | May 03, 2024 @ 05:21:01 PM | May 03, 2024 @ 05:21:01 PM | Edit Delete |
| 8 | Restoran 168 | Taman Sentosa, Klang | +0109769828 | - | alex wong | May 01, 2024 @ 12:30:00 PM | May 01, 2024 @ 12:30:00 PM | Edit Delete |
| 9 | Tan Ah Huat | Bandar Bukit Raja, Klang | +0123172123 | grade b | alox wong | Apr 30, 2024 @ 12:06:52 PM | Apr 30, 2024 @ 12:06:52 PM | Edit Delete |

Fig.15 List of Customer interface

Figure 16 the order interface where Admin or staff members can easily add products to an order. By clicking the "Add Another Product" button, they can include more items in the order, selecting each product and specifying the quantity needed. If any unwanted products are added by mistake, the remove button allows for easy deletion of those rows. Once all products and quantities are entered correctly, users simply click the submit button to finalize and process the order. This streamlined interface simplifies the order management process, ensuring accuracy and efficiency in placing orders within the system.

Fig.16 Add New Order interface

Figure 17 presents a comprehensive list of orders, each assigned a unique batch number for tracking purposes. By default, orders are initially recorded with a " pending status," indicating that they are awaiting further action or processing. Users can change the status of an order by clicking the update button and editing the order information as needed. This functionality allows for efficient order management, enabling users to update order statuses, edit details, and ensure accurate processing of orders within the system.

| BATCH #: 1717627782 | | | | | | | | |
|---------------------|-----------------|-------------|--------------|-------------------------|------------|------------|---------------------|------------------|
| # | PRODUCT | QTY ORDERED | QTY RECEIVED | CUSTOMER | STATUS | ORDERED BY | CREATED TIME | DELIVERY HISTORY |
| 1 | grade b-updated | 400 | | Restaurant 88 | pending | alex wong | 2024-06-06 00:49:42 | Deliveries |
| Update | | | | | | | | |
| BATCH #: 1717575360 | | | | | | | | |
| # | PRODUCT | QTY ORDERED | QTY RECEIVED | CUSTOMER | STATUS | ORDERED BY | CREATED TIME | DELIVERY HISTORY |
| 1 | grade b | 5 | 3 | Tan Ah Huat | incomplete | alex wong | 2024-06-05 10:16:00 | Deliveries |
| 2 | grade a | 10 | 10 | Restaurant Urban Masala | complete | alex wong | 2024-06-05 10:16:00 | Deliveries |
| Update | | | | | | | | |

Fig.17 List of Order interface

Figure 18 illustrates the update status of the order interface, specifically focusing on entering the quantity delivered to customers. This form is designed to input the number of products that will be delivered to fulfill the order. The order status can be one of three options: pending, incomplete, or complete. The status change to complete when the quantity delivered matches the quantity ordered. This streamlined process ensures accurate tracking of order fulfillment and provides clarity on the status of each order within the system.

| PRODUCT NAME | QTY ORDERED | QTY RECEIVED | QTY DELIVERED | CUSTOMER | STATUS |
|-----------------|-------------|--------------|---------------|---------------|---------|
| grade b-updated | 400 | | 0 | Restaurant 88 | pending |

Fig.18 Update Order interface

Figure 19 depicts the alert interface that appears when an admin or staff member enters a quantity delivered that exceeds the quantity originally ordered for a particular product. This alert is designed to notify users of the discrepancy and prompt them to review and correct the entered quantity. Exceeding the ordered quantity may indicate a mistake or error in the data entry process, and the alert serves as a precautionary measure to prevent inaccuracies in order fulfillment and inventory management. Users can then adjust the quantity delivered to match the quantity ordered, ensuring accurate record-keeping and a seamless order processing experience.

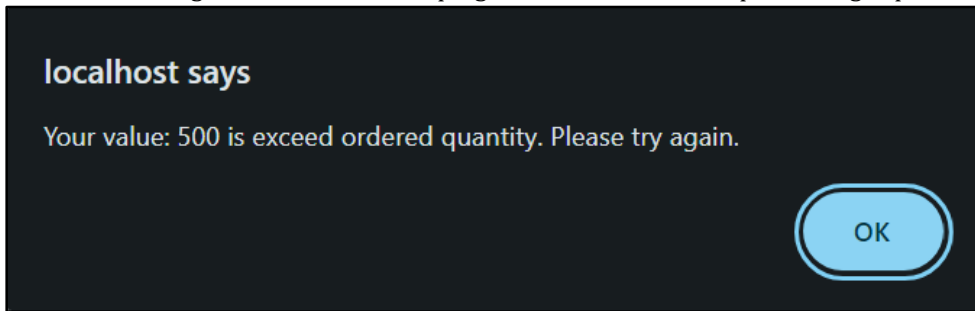


Fig.19 Alert interface

Figure 20 illustrates the delivery history for the orders, providing a chronological record of all past deliveries associated with orders.

| # | DATE RECEIVED | QUANTITY RECEIVED |
|---|-------------------------------|-------------------|
| 1 | Wed, 05 Jun 2024 16:59:47 GMT | 10 |
| 2 | Wed, 05 Jun 2024 17:01:09 GMT | 20 |
| 3 | Wed, 05 Jun 2024 17:01:19 GMT | 10 |
| 4 | Wed, 05 Jun 2024 17:01:26 GMT | 15 |
| 5 | Wed, 05 Jun 2024 17:01:34 GMT | 20 |
| 6 | Wed, 05 Jun 2024 17:01:45 GMT | 100 |

Fig.20 Delivery History interface

Figure 21 illustrates the creation of users with permission. This interface is designed to enable administrators or authorized personnel to set up new user accounts and define the access levels and permissions associated with each user.

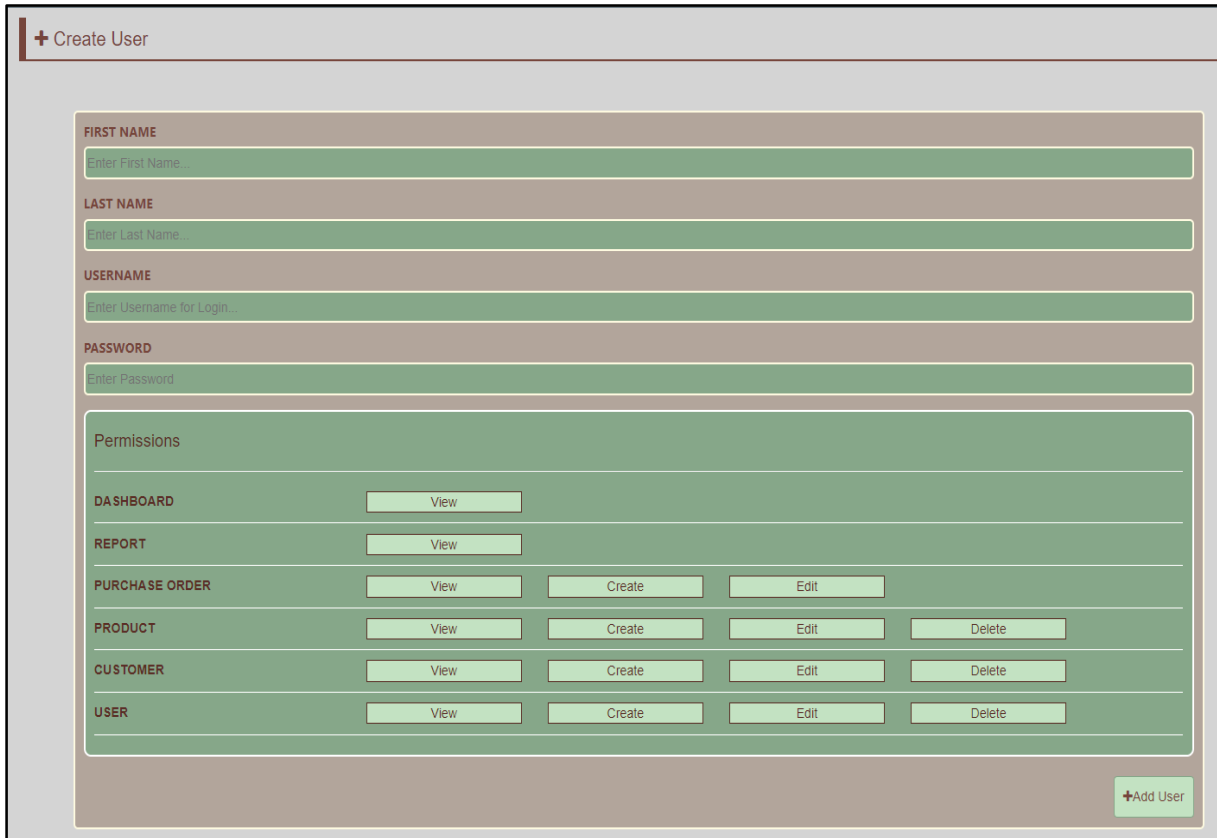


Fig.21 Add User interface

Figure 22 the scenario where permission access is denied for a specific user within the system. This situation typically arises when an authorized administrator or user with permission management privileges restricts or revokes certain access rights or privileges for a particular user account. The interface may display a notification or message indicating that the user's access has been denied or restricted, along with details about the specific permissions or functionalities that are no longer accessible.

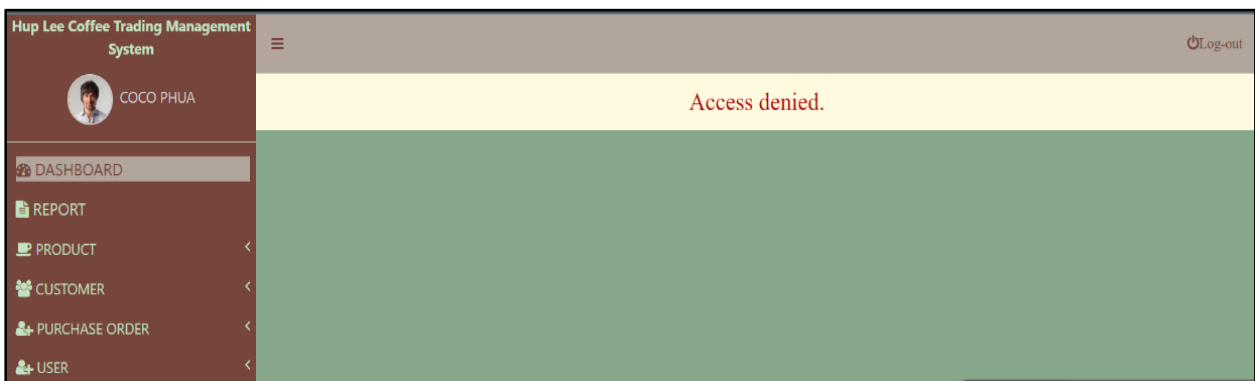


Fig.22 Permission access denied interface

Figure 23 shows the list of users of the system, providing an overview of all user accounts added to the system. This list includes information about each user, such as their first name, last name, username, and permissions. Staff can CRUD (Create, View, Update, and Delete) the customer and products in the system with permission access. The interface allows staff members with appropriate permission access to perform various actions related to customer and product management, including creating, viewing, updating, and deleting customer and product records.



Fig.23 List of User interface

5.1.2 Functional Testing

After the system's completion, a functional testing phase is conducted, with the primary goal of ensuring that each feature of the software functions according to the specified requirements. This testing phase is crucial for uncovering syntax errors, bugs, and security vulnerabilities. It also evaluates the system's usability, functionality, and overall user experience. A test case document is created to verify that the system meets the derived requirements. This document includes a set of test data, detailed descriptions, and expected outcomes for each test scenario, ensuring comprehensive system validation. Table 5 shows the module-specific test cases result.

Table 5 Functional Testing

| Function | Test Case | Description | Result |
|---------------------|--------------------------------|---|--------|
| Login | Login page | Launch the login page by clicking the top-side button from the homepage. | PASS |
| | Dashboard | Launch the admin and staff dashboard after entering their username and password successfully. | PASS |
| | Error message | Launch error message if users did not enter the correct username and password. | PASS |
| | Required message | Launch the required message to fill in for those who leave the form blank. | PASS |
| Customer Management | Add & view customer page | Launch the add and view customer page by clicking the button at the sidebar. | PASS |
| | Response message | Launch response message when the data is added to the system. | PASS |
| | Update & Delete function | Launch update & delete function when user click on button at action column. | PASS |
| | Reach updated data to database | Launch and reach the updated data to the database. | PASS |
| Order Processing | Add & view order page | Launch the add and view purchase order page by clicking the button at the sidebar. | PASS |
| | Add function | Launch an add function for adding the new purchase order for the customer. | PASS |
| | Update function | Launch update function when user click on update button. | PASS |
| | Check delivery quantity | Launch and check if the delivery quantity does not exceed the order quantity. | PASS |
| | Delivery history | Launch and show the delivery history of the product by clicking the deliveries button. | PASS |

Table 5 Functional Testing (cont.)

| | | | |
|--------------------|----------------------|---|------|
| Report & Analytics | Launch report | Launch the report in pdf and excel. | PASS |
| | Launch analytic | Launch analytic function in dashboard. | PASS |
| | Graph information | Launch the correct information in graph after data is updated to the system | PASS |
| User Management | Add & view user page | Launch the add and view user page in the system. | PASS |
| | Permission access | Launch the user access permission to the system. | PASS |
| | CRUD function | Launch the CRUD (Create, Read, Update, & Delete) function in the system. | PASS |

6. Conclusion

In conclusion, the development of the Hup Lee Coffee Trading Management System represents a pivotal shift towards efficient and streamlined coffee trading operations. By transitioning from manual processes to a systematic web-based platform, the system addresses key challenges faced by the company, such as document control, inventory management, and decision-making inefficiencies. Utilizing technologies such as HTML, CSS, PHP, JavaScript, and MySQL, the system has streamlined operations, enhanced productivity, and supported informed decision-making. With its emphasis on real-time reporting, inventory optimization, and enhanced productivity, this system marks a significant step towards a more agile, data-driven, and responsive approach to managing coffee trading operations. Comprehensive testing has ensured that the system meets user requirements, although some weaknesses, such as the absence of a search function and limited client access to project updates, were identified. To address these issues, recommendations have been made to further improve the system's functionality. Through improved inventory control, optimized production processes, and efficient document retrieval, the system aims to propel Hup Lee Coffee Trading towards greater efficiency, informed decision-making, and overall operational excellence within the coffee trading industry. Overall, the project has laid a solid foundation for ongoing enhancements, ultimately providing significant benefits to both managers and staff at Hup Lee Coffee Trading Sdn. Bhd.

Acknowledgement

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Conflict of Interest

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

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Phua Huaysze, Noryusliza Binti Abdullah; **data collection:** Phua Huaysze; **analysis and interpretation of results:** Phua Huaysze, Noryusliza Binti Abdullah; **draft manuscript preparation:** Phua Huaysze, Noryusliza Binti Abdullah. All authors reviewed the results and approved the final version of the manuscript.*

References

- [1] O. Moreno Almanza and J. R. Aguilar Cisneros, "Towards a knowledge management system for the strengthening of coffee production: A case study in the Panama Canal Basin, Panamá Oeste province," *Green Technologies and Sustainability*, vol. 2, no. 1, p. 100056, Jan. 2024, doi: 10.1016/j.grets.2023.100056.
- [2] A. Báez-Hernández, C. A. Hernández-Medina, and M. A. Carrasco-Fuentes, "Modelo de gestión del conocimiento para el desarrollo agropecuario local," *Estudios Sociales. Revista de Alimentación Contemporánea y Desarrollo Regional*, vol. 28, no. 51, Jan. 2018, doi: 10.24836/es.v28i51.517.
- [3] C. Deina *et al.*, "A methodology for coffee price forecasting based on extreme learning machines," *Information Processing in Agriculture*, vol. 9, no. 4, pp. 556–565, Dec. 2022, doi: 10.1016/j.inpa.2021.07.003.
- [4] D. M. Rahmah, D. Purnomo, F. Filianty, I. Ardiansah, R. Pramulya, and R. Noguchi, "Social Life Cycle Assessment of a Coffee Production Management System in a Rural Area: A Regional Evaluation of the Coffee Industry in West Java, Indonesia," *Sustainability*, vol. 15, no. 18, p. 13834, Sep. 2023, doi: 10.3390/su151813834.
- [5] Y. Kittichotsawat, V. Jangkrajarn, and K. Y. Tippayawong, "Enhancing Coffee Supply Chain towards Sustainable Growth with Big Data and Modern Agricultural Technologies," *Sustainability*, vol. 13, no. 8, p. 4593, Apr. 2021, doi: 10.3390/su13084593.
- [6] K. Leerojanaprapa, K. Bhundarak, W. Atthirawong, and K. Sirikasemsuk, "Inventory Management for Consumer Products: A Distribution Center in Thailand," in *2022 10th International Conference on Traffic and Logistic Engineering (ICTLE)*, IEEE, Aug. 2022, pp. 128–133. doi: 10.1109/ICTLE55577.2022.9901839.
- [7] R. W. Schmenner and M. L. Swink, "On theory in operations management," *Journal of Operations Management*, vol. 17, no. 1, pp. 97–113, Dec. 1998, doi: 10.1016/S0272-6963(98)00028-X.
- [8] A.-P. Hameri and L. A. Weiss, "The impact of acquisitions on inventory performance," *Journal of Advances in Management Research*, vol. 14, no. 3, pp. 288–312, Aug. 2018, doi: 10.1108/JAMR-05-2016-0033.
- [9] G. Priniotakis and P. Argyropoulos, "Inventory management concepts and techniques," *IOP Conf Ser Mater Sci Eng*, vol. 459, p. 012060, Dec. 2018, doi: 10.1088/1757-899X/459/1/012060.
- [10] B. S. S. Tejesh and S. Neeraja, "Warehouse inventory management system using IoT and open source framework," *Alexandria Engineering Journal*, vol. 57, no. 4, pp. 3817–3823, Dec. 2018, doi: 10.1016/j.aej.2018.02.003.
- [11] R. Conway, W. Maxwell, J. O. McClain, and L. J. Thomas, "The Role of Work-in-Process Inventory in Serial Production Lines," *Oper Res*, vol. 36, no. 2, pp. 229–241, Apr. 2019, doi: 10.1287/opre.36.2.229.
- [12] Max Muller, "Essentials_of_Inventory_Management," *HarperCollins Leadership*, vol. illustrated, 2019.
- [13] Waters and Donald, *Inventory Control and Management*, 2nd ed. Wiley, 2008.
- [14] B. Rawat, S. Purnama, and M. Mulyati, "MySQL Database Management System (DBMS) On FTP Site LAPAN Bandung," *International Journal of Cyber and IT Service Management*, vol. 1, no. 2, pp. 173–179, Oct. 2021, doi: 10.34306/ijcitsm.v1i2.47.
- [15] W3Techs, "Usage of content management systems for websites," 2022. [Online]. Available: https://w3techs.com/technologies/overview/content_management. [Accessed: 02-Nov-2023].
- [16] K. J. Kim and C. J. Bonk, "The Future of Online Teaching and Learning in Higher Education: The Survey Says...," *Educause Quarterly*, vol. 29, no. 4, pp. 22-30, 2019.

- [17] F. Provost and T. Fawcett, *Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking*. O'Reilly Media, 2020.
- [18] L. Sarah, "What is Prototype," 2023. [Online]. Available: <https://www.techtarget.com/searchcio/definition/PrototypingModel#:~:text=The%20prototyping%20model%20is%20a,or%20product%20can%20be%20developed>. [Accessed: 20-Nov-2023].
- [19] "SDLC-Agile Model," tutorialspoint, 2023. [Online]. Available: https://www.tutorialspoint.com/sdlc/sdlc_agile_model.htm. [Accessed: 20-Nov-2023].