

MySurf Technology Inventory Management System

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Abstract

The use of digital recording technology has become important for operational optimisation in a variety of sectors. MySurf Technology, a computer accessories store, is currently dealing with inventory management inefficiencies as a result of its reliance on obsolete manual recording systems, particularly those centred on Microsoft Excel. This reliance on previous methods causes inconsistencies in inventory counts and takes a significant amount of time for detailed calculations. To address these ongoing issues, a sophisticated inventory management system created for MySurf Technology is being developed. This system aims to improve inventory management, improve sales reporting, and reduce mistakes common in manual record-keeping techniques. Using a prototype model for system development enables for early user involvement, allowing for a better understanding of the system's functionality and the early detection of any errors. Upon completion, the system has successfully maintained MySurf's inventory information systematically, allowing for quick data access and retrieval. This technical innovation is expected to improve operational efficiency, enabling data-driven decision-making, and enhance customer service standards, ensuring MySurf's competitiveness in today's market environment.

1. Introduction

Efficient inventory management serves as a crucial element within business operations, ensuring optimal stock administration while minimizing errors [1]. In today's rapidly evolving technological landscape, the significance of automated inventory systems has significantly increased. Nevertheless, several industries, including retail sectors such as computer accessories, face operational challenges due to manual inventory procedures.

MySurf Technology, a computer accessories store is currently relies on a manual inventory management system, combining spreadsheet tools and physical records. Staff members actively engage in daily inventory management tasks, including recording product data, verifying stock levels, and initiating purchase orders when supplies run low. These tasks solely depend on Microsoft Excel spreadsheets. However, these manual approaches have led to inefficiencies, increased human error, and the risk of overstocking or stockouts, resulting in revenue loss and customer dissatisfaction.

Consequently, MySurf Technology faces numerous challenges arising from its current inventory management approach. Inaccuracies and inconsistencies in stock levels result from inefficient data entry methods. The lack of comprehensive inventory visibility complicates informed restocking decisions. Furthermore, reliance on spreadsheets introduces errors and mismanagement, incurring additional costs and missed sales opportunities.

Recognizing the urgent need for a more systematic and automated solution, MySurf Technology aims to address these challenges.

The proposed solution involves developing and implementing an advanced inventory management system tailored specifically for MySurf Technology. This system aims to automate inventory management processes, offering continuous monitoring, comprehensive reporting, and data-driven decision-making capabilities. By leveraging this system, MySurf Technology anticipates improvements in accuracy, reduced operational costs, and increased customer satisfaction, resulting in enhanced efficiency and profitability.

2. Literature Review

MySurf Technology is a small-scale business established in 2005 in Banting, Selangor. The business meets the technological needs of the local community by providing computer repair services as well as retailing computer goods and accessories. They offer computer repair solutions and a wide range of computer-related products, including accessories and key components, with the goal of serving and supporting customers in their computing endeavours.

MySurf Technology manages inventory through manual entry on Excel spreadsheets and physical records. This method is error-prone and inefficient, lacking dedicated software. It leads to issues like inaccurate stock levels, ineffective restocking decisions, and potential overstocking or stockouts. The current manual method's limits and problems require the development of a new system. As a result, developing a new inventory management system is crucial for MySurf Technology to automate procedures, improve accuracy, and assure effective inventory control, addressing these difficulties and streamlining operations.

2.1 Web-based Information System

Web-based information systems consist of data, interfaces, and geographic components meticulously gathered to bolster and enhance business operations[1]. MySurf Technology's inventory management system is a web-based information system that integrates cutting-edge web-based technology with the robust functionality of MySQL database management. This integration results in a comprehensive platform specifically designed to manage and optimize inventory-related data.

At its core, this system features user-friendly web interfaces accessible through standard web browsers. These interfaces empower users with intuitive tools to efficiently oversee inventory aspects, such as monitoring stock levels, processing orders, and generating detailed reports. The utilization of MySQL as the backend database ensures secure and efficient storage, management, and retrieval of crucial inventory records.

Moreover, the web-based information system simplifies and organizes the previously used manual procedures for easier and more efficient use[2]. This innovative integration seamlessly combines the user-friendly attributes of web interfaces with the reliability of MySQL, significantly enhancing operational efficiency. By transitioning from traditional manual processes to this sophisticated web-based information system, routine inventory tasks, including management, real-time monitoring, order processing, and report generation, are streamlined and optimized. This transformative shift enhances accessibility and efficiency for authorized users, ultimately driving a significant improvement in overall productivity within MySurf Technology's inventory management practices.

2.2 Study of Existing Related System

Comparing existing systems is essential for understanding the strengths, weaknesses and capabilities. The evaluation assists in identifying areas for improvement, allowing for more informed decisions when selecting or improving systems. Insights are obtain into how to develop and create more efficient solutions through studying multiple systems[3]. Finally, this comparison is crucial for making informed choices, optimizing technology, and driving progress in various industries. Three existing related systems are being studied and analyzed in a table to facilitate the comparison of each module within each system. The comparison results are shown as in Table 1.

Table 1 Comparison between existing system

Module	At-Thoyyib Inventory Management System	Laboratory Inventory System (LIS)	One Stop Centre Inventory System (OSCenTIS)	MySurf Technology Inventory Management System
Log in	√	√	√	√
Profile Management	√	√	√	√
Inventory	√	√	√	√
Sales	X	X	√	√
Sales Report	√	X	X	√

3. Methodology/Framework

The prototyping model was chosen for this project because of its ability to help users understand their needs through the prototypes developed. This approach initiates with fundamental analysis and design, progresses through to completion and then advances to the implementation phase focused on the system prototype[3]. It allow users to gain an understanding of the system's functions through the accessible interactions. The key advantage of a prototyping is the rapid development of a system that allows for user engagement[4]. Furthermore, this method assists in the early detection of errors and overlooked functions. The prototype approach is appropriate for smaller-scale projects with low complexity that must be completed in a short period of time.

The prototype model is structured across six distinct phases, with Table 2 outlining the specific tasks and findings achievable within each phase. These delineated activities serve the purpose of streamlining the monitoring process during the evolution of system development. By systematically organizing these phases and their corresponding tasks, it becomes easier to track progress, identify potential hurdles, and ensure a comprehensive understanding of the system's developmental path.

Table 2 Software Development Task and Output for Phases in Prototype Model

Phase	Task	Output
Planning	<ul style="list-style-type: none"> Proposed Project Determine project schedule Identify project objectives, problem statement, scope 	<ul style="list-style-type: none"> Project proposal Gantt chart System requirements
Analysis	<ul style="list-style-type: none"> Analysing system requirements Conduct stakeholder interviews Determine development tools 	<ul style="list-style-type: none"> User requirement specification Data flow diagram Entity relationship diagram
Design	<ul style="list-style-type: none"> Define system architecture and components Design user interface and system interactions 	<ul style="list-style-type: none"> System architecture specification User interface designs

Prototype	<ul style="list-style-type: none"> • Build functional prototype 	<ul style="list-style-type: none"> • Functional prototype of the system
Implementation	<ul style="list-style-type: none"> • Write code to implement functionalities • Integrate system components 	<ul style="list-style-type: none"> • Coded functionalities • Integrated system components
Testing	<ul style="list-style-type: none"> • Conduct system testing • Identify errors or discrepancies 	<ul style="list-style-type: none"> • System testing results • Updated system based on feedback

4. System Analysis & Design

System analysis and design are crucial for creating efficient systems. This involves essential diagrams like the context diagram, Level 0 data flow diagram, entity relationship diagram and flowchart. The context diagram illustrates system interactions, the Level 0 DFD displays processes and data flow, the ERD represents entity relationships and flowcharts visualize detailed processes within the system. These diagrams are fundamental for understanding system components during development.

4.1 Context Diagram

The context diagram is essential in defining the scope and boundaries of the system. Its purpose is to demonstrate the system's core components and their interactions with external entities. This diagram provides a clear representation of the entities involved and their connections by presenting the relationships between the system and its external environment, assisting in a comprehensive understanding of the system's interactions. The following Fig. 1 displays the context diagram designed for the MySurf Technology inventory management system.

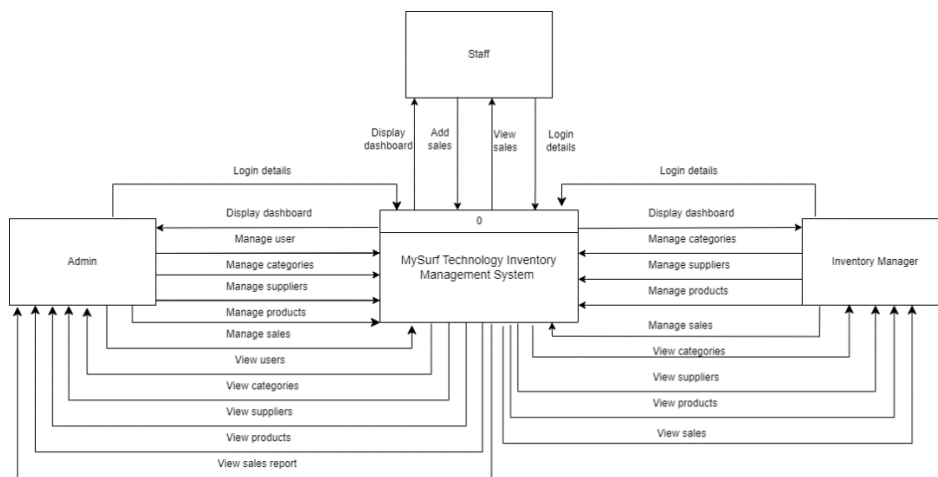


Fig. 1 Context Diagram

4.2 Data Flow Diagram Level 0

A data flow diagram (DFD) serves as a visual representation that narrates the flow of input and output data from one process to another[5]. This diagram outlines the core processes within the system, encompassing functions such as login, stock product management, managing sales data and report generation. It visually represents the data flow within each process. Fig. 2 is a data flow diagram level 0 that extends from the context diagram, providing a more detailed representation of data flow between processes.

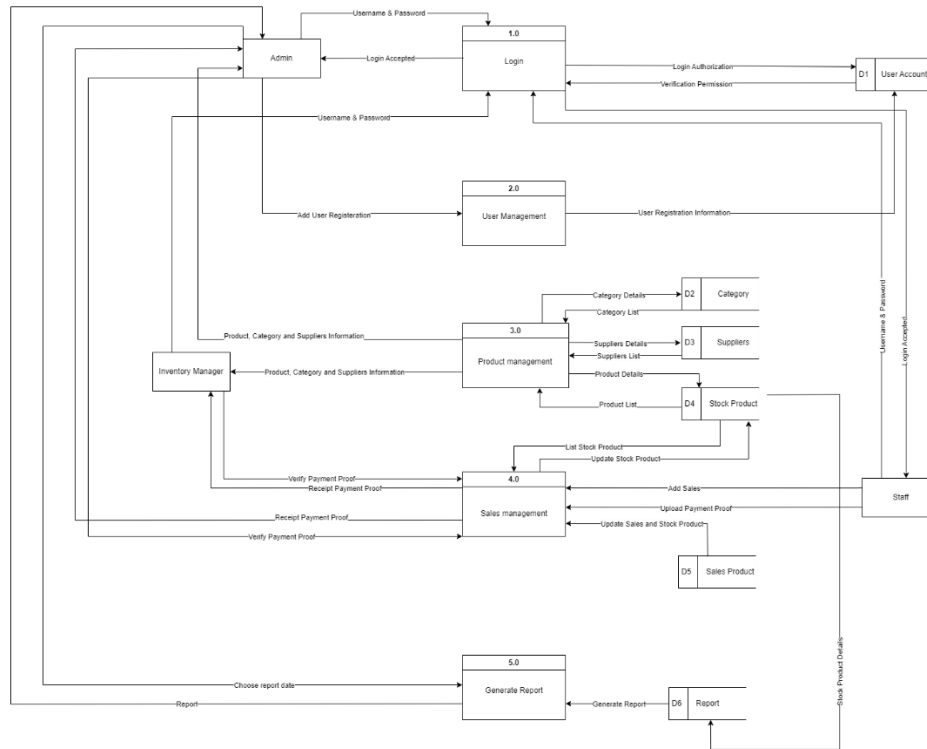


Fig. 2 DFD Level 0

4.3 Entity Relationship Diagram (ERD)

The entity relationship diagram can be defined as a diagram that explains the relationship between each entity [6]. It visually represents the connections and attributes, simplifying the understanding of complex data structures and aiding in effective database design. Fig. 3 is the entity relationship diagram for MySurf Technology inventory management system.

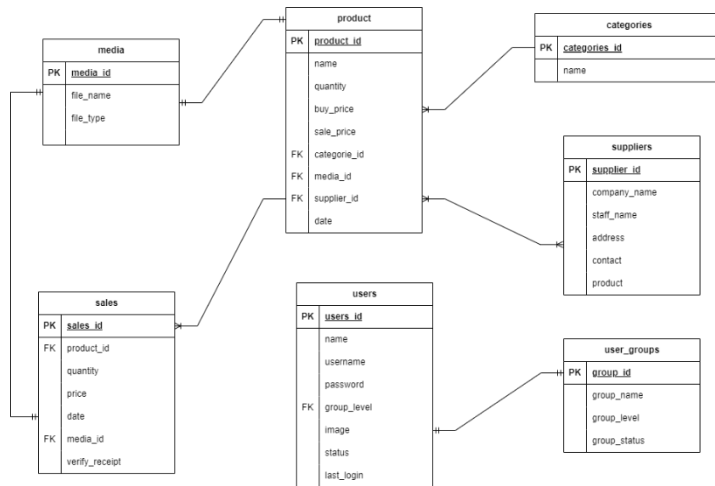


Fig. 3 Entity Relationship Diagram (ERD)

4.4 Flowchart

Flowcharts serve as a flexible and effective method to visually represent a system’s operations and the intricate logic within complex processes [7]. By illustrating steps, actions, and decision points, they offer a clear overview and facilitate a deeper understanding of how a process functions. These visual diagrams simplify complex procedures, making them more accessible for analysis, problem-solving, and optimization. Moreover, flowcharts play a pivotal role in enhancing communication and collaboration among team members, enabling a cohesive

understanding of workflows and fostering efficient decision-making processes. Flowchart of this system for each user are shown in fig.4, fig.5 and fig.6 below.

[1]

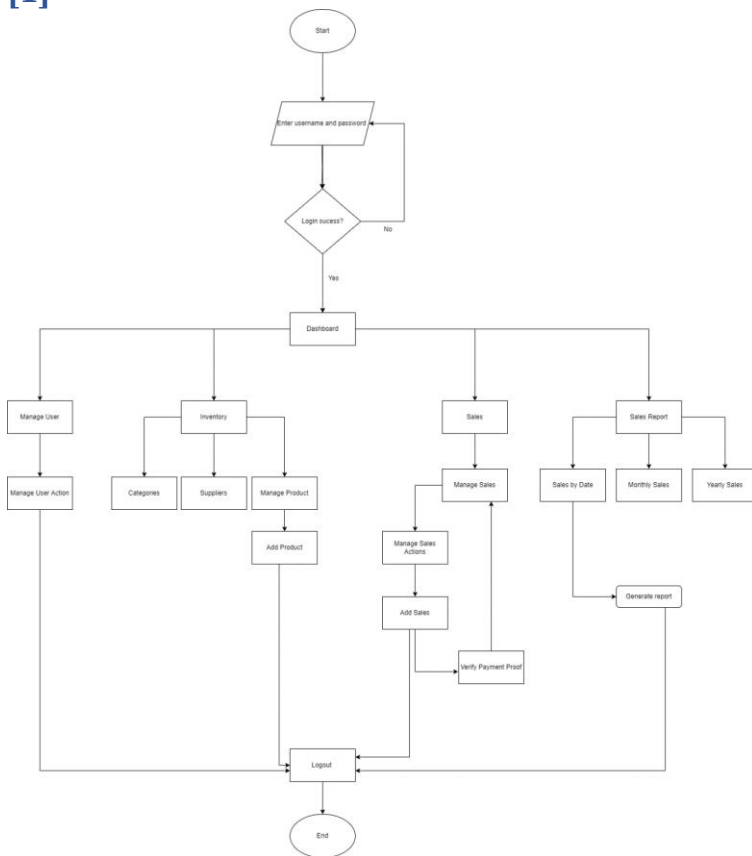


Fig.4 Flowchart for Administrator

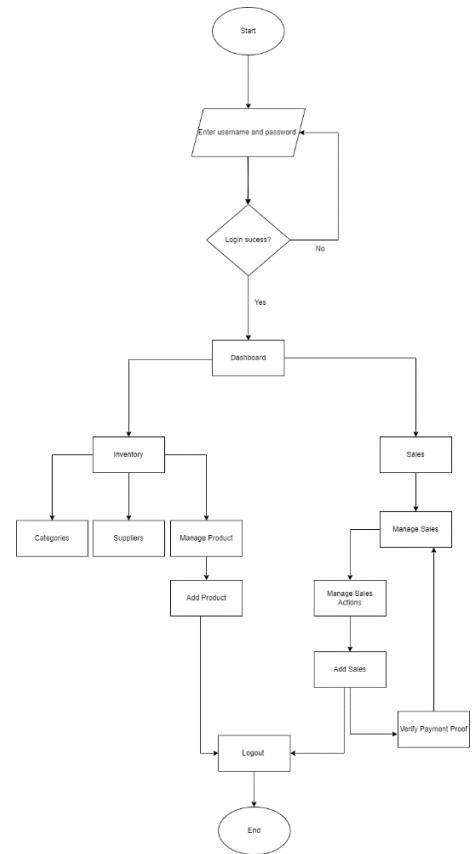


Fig. 5 Flowchart for Inventory Manager

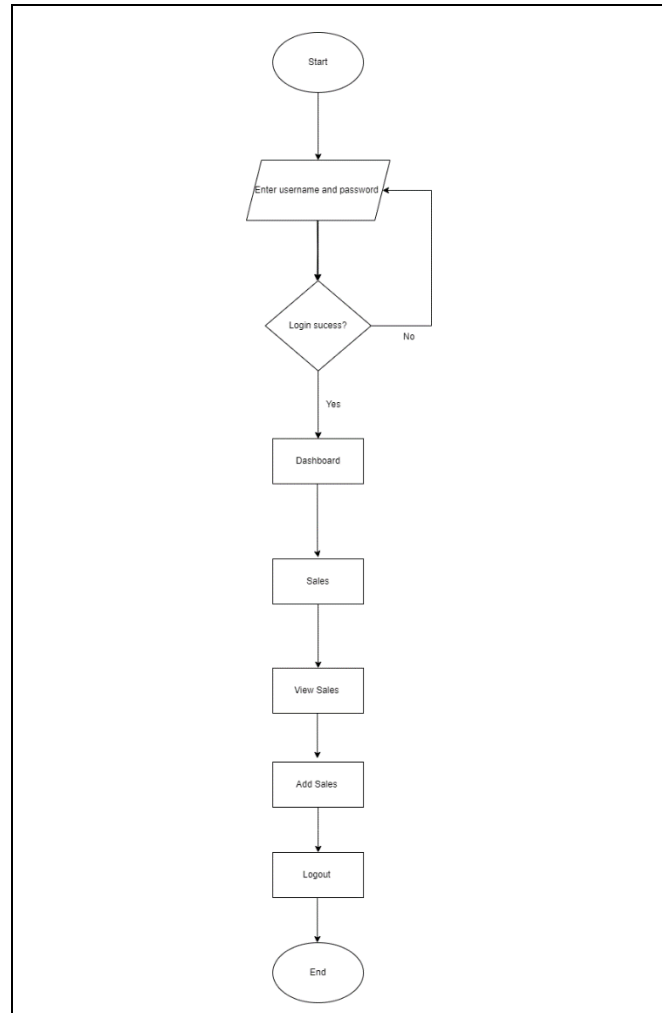


Fig.6 Flowchart for Staff

5. Implementation and Testing

The MySurf Technology Inventory Management System was developed with the aim of achieving specified needs while maintaining quality standards. The process involved developing several programs as well as creating a comprehensive database. The testing was conducted to ensure that the system functions without errors and meets the demands and requirements of the users. Testing was conducted with select users before deploying the system to all users, confirming that all functions performed as expected and the system operated smoothly.

5.1 System Implementation

The implementation phase focuses on making the inventory management system's design into an operational system. MySurf Technology Inventory Management System is a web-based system developed using PHP, HTML, CSS and SQL programming languages. Other than that, software such as Visual Studio Code and PHP MyAdmin are used as the development tools for this system. During implementation, several modules of the system were developed and integrated such as user authentication, user management, inventory management, sales management and sales reporting. The implementation also included creating a secure and efficient database structure to manage all inventory-related data.

Fig. 7 below shows the interface of the dashboard system. The interface includes navigation options for Dashboard, Profile, Inventory, Sales, and Sales Report. Key metrics displayed are the number of users, categories, products, and total sales. It also features sections for the highest selling products, latest sales, and recently added products.

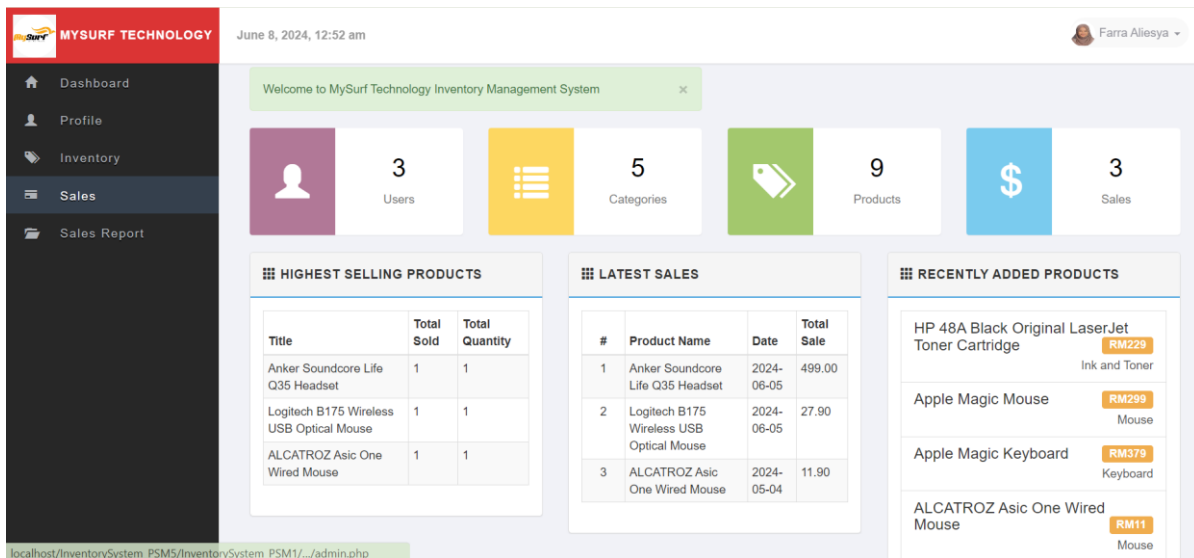


Fig.7 User’s Dashboard Page

Fig. 8 is the Suppliers interface of the system. The primary section of this page consists of a table with supplier information, such as ID, company name, staff name, address, contact, product, and actions for deleting supplier information. There is also a "Add New Suppliers" button to add new suppliers.

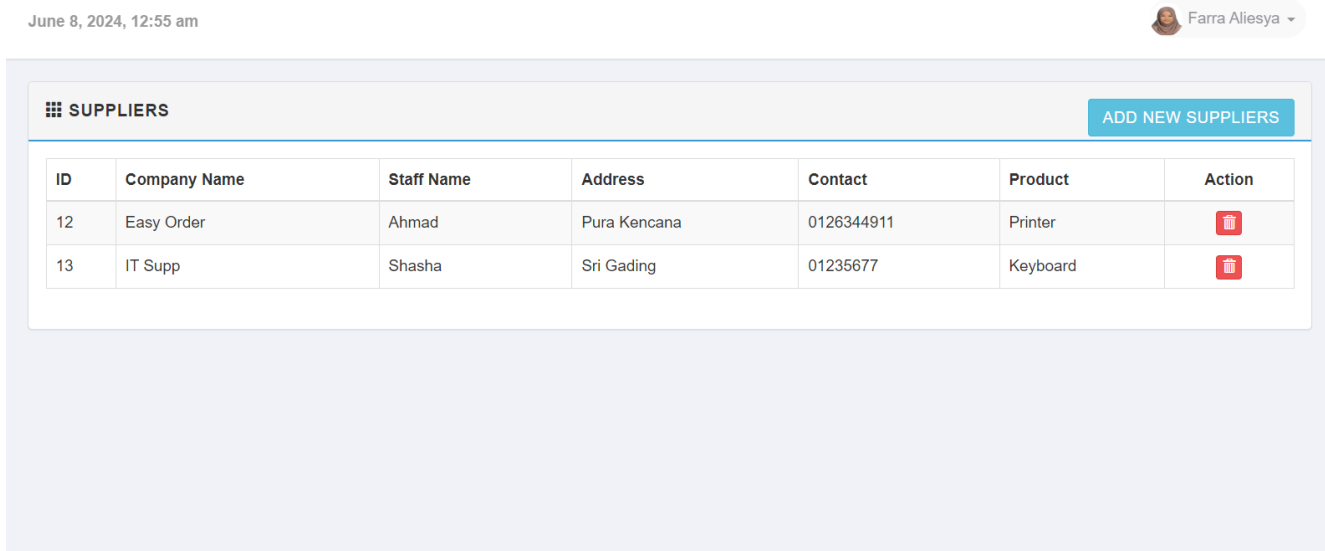


Fig. 8 Supplier’s Page

Fig. 9 below shows the "Add New Product" interface. This section allows users to input new product information, such as the product name, category, quantity, buying price, and selling price. There are also options to upload a product photo and an "Add product" button to save the new entry.

June 8, 2024, 12:56 am

Fig. 9 Add New Product Page

Manage Sales interface are shown in the fig. 10 below. This section displays sales transactions in a table including the product name, quantity, price, date, payment proof, verification status, and options for editing or deleting sales. Users can use the search box to find specific sales by product name and create new sales by clicking the "Add Sale" button.

June 8, 2024, 12:57 am Farra Aliesya

ALL SALES ADD SALE							
Search by product name		<input type="text"/>					
		<input type="button" value="Search"/>					
#	Product name	Quantity	Price	Date	Payment Proof	Verified	Actions
1	ALCATROZ Asic One Wired Mouse	1	11.90	2024-05-04		Verified	
2	Logitech B175 Wireless USB Optical Mouse	1	27.90	2024-06-05		Verified	
3	Anker Soundcore Life Q35 Headset	1	499.00	2024-06-05		Not Verified	

Fig. 10 Manage Sales Page

Fig. 11 is the Sales Report interface. The report provides a detailed breakdown of sales transactions, including the product name, buying price, selling price, quantity sold, and the total amount generated from each sale. This information helps in determining the financial performance and inventory turnover of various products over a certain time period.

MySurf Technology - Sales Report					
2024-05-05 TILL DATE 2024-06-11					
Date	Product Name	Buying Price	Selling Price	Quantity	TOTAL
2024-06-05	Anker Soundcore Life Q35 Headset	497.00	499.00	1	499.00
2024-06-05	Logitech B175 Wireless USB Optical Mouse	25.90	27.90	1	27.90
				GRAND TOTAL	RM 526.90
				PROFIT	RM4.00

Fig. 11 Sales Report Page

5.2 Functionality Testing

Functional testing is one of the most important phases in the development of MySurf Technology Inventory Management System. It is to ensure that all components and modules work and perform as expected. The main purpose of functional testing is to verify that the system works according to the specified requirements and functions properly under various conditions. This functional testing will involve test cases, expected outputs and actual outputs.

Table 3 Functional Testing List

Module	Testing	Expected Output	Result
Log in	Log in account	If valid, access is granted and the homepage is displayed.	Passed
Profile Management	Add, edit, or delete users	User details are successfully updated	Passed
Inventory	Add, edit, or delete inventory products	Inventory products are accurately updated	Passed
Sales	Process sales transactions and verify payments	Sales are recorded and payment proofs are verified	Passed
Sales Report	Generate sales report for specified period	Accurate report is generated	Passed

5.3 User Acceptance Testing

User Acceptance Testing (UAT) is an important phase in software development where users verify that the system meets their needs and business requirements. Its primary purpose is to collect data ensure the software functions correctly in real-world scenarios, identifying any last issue before deployment to guarantee a smooth user experience. This test was conducted to gather user feedback and access satisfaction levels regarding the developed system. Therefore, the test was carried out on 5 respondents who are owner and employees of MySurf Technology. The survey questions and findings are as shown in fig. 12 and fig. 13 below.

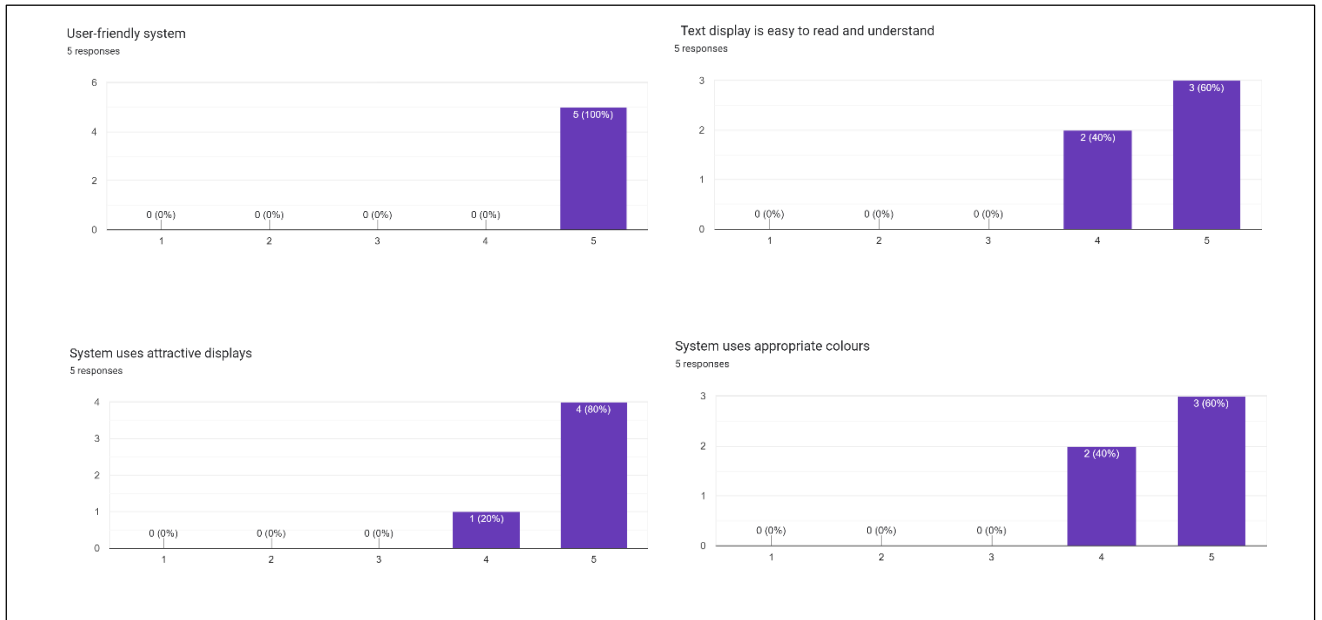


Fig.12 Testing Result Graph

The survey results in Fig. 12 show a very good user experience with the system. All respondents evaluated the system as user-friendly which is 5 out of 5. For language readability and understanding, 60% of respondents gave the maximum rating, while 40% gave it a 4. Regarding the attractiveness of displays, 80% rated it 5, and 20% rated it 4. Similarly, 60% evaluated the appropriateness of the system's colours as 5, while 40% rated it as 4. These findings show that users strongly agree on the system's usability, text clarity, visual attractiveness, and effective colour usage.

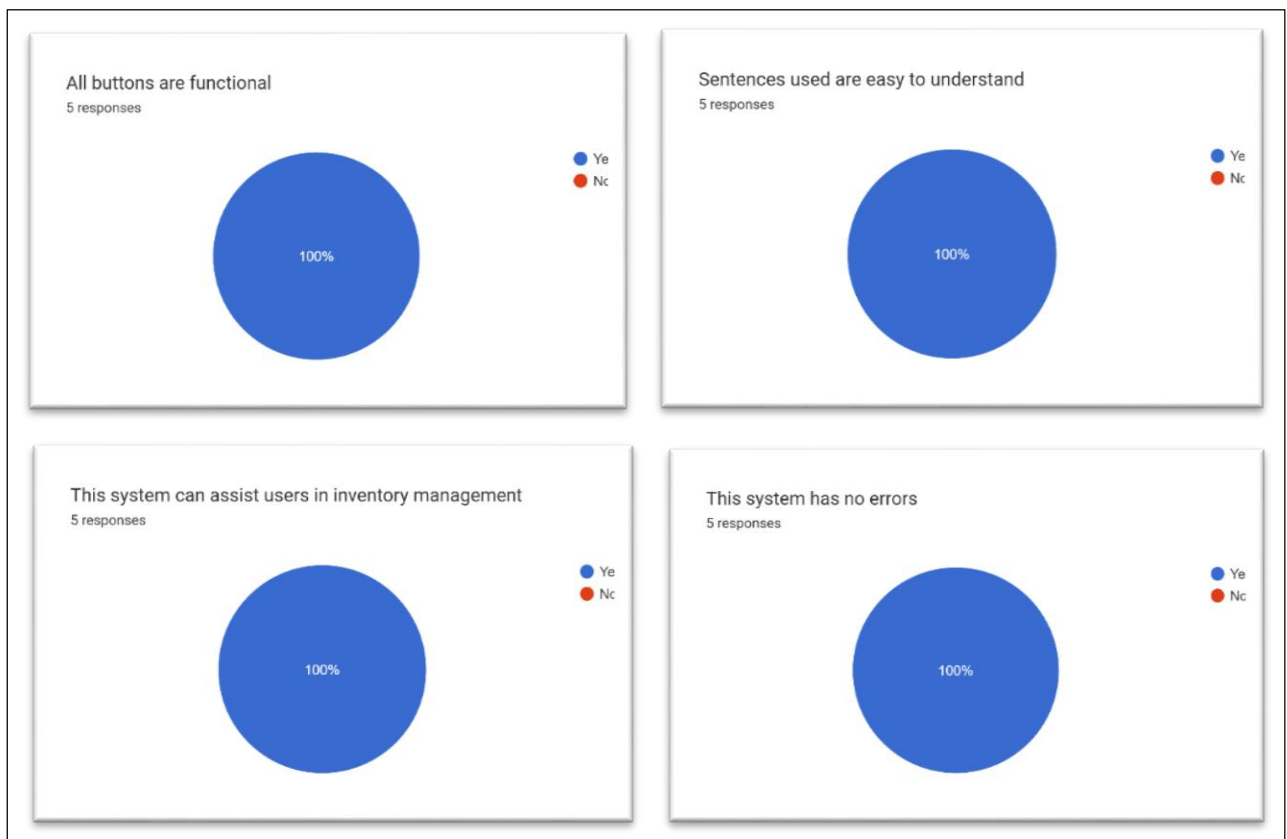


Fig.13 Testing Result Graph

The survey's findings in Fig. 13 indicate general satisfaction with the system in a variety of aspects. All responders 100% agreed that all buttons are functional, the sentences used are simple to understand, the system

could assist users with inventory management, and there are no errors. These findings show that the system has an excellent level of functionality, clarity, stability, and usefulness, indicating its effectiveness and usability.

6. Conclusion

In conclusion, this project emphasizes the importance of MySurf Technology transitioning from manual inventory methods to an advance management system. This transformation aims to address inefficiencies in inventory tracking, improve the accuracy of sales reporting, reduce errors and associated with manual record-keeping. The anticipated outcomes include increased operational efficiency, data-driven decision making and enhanced customer service quality. Future research possibilities may include examining the system's long-term impacts, conducting comparative assessments and exploring scalability, all of which could provide valuable insights for ongoing innovation and improvement in inventory management practices.

7. Acknowledgement

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