American International University-Bangladesh (AIUB)

Online Point of Sale System

A software project

Submitted by

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Abstract

The Online Point of Sale (POS) System represents a comprehensive solution designed to streamline and enhance the management of sales transactions for businesses operating in various industries. This software application offers a user-friendly interface accessible via web browsers, empowering businesses with the flexibility and convenience of conducting sales operations from any internet-enabled device.
At its core, the Online POS System integrates robust features tailored to meet the diverse needs of modern businesses, ranging from small-scale retailers to large enterprises. Key functionalities include inventory management, sales tracking, and customer relationship management, all seamlessly interconnected to optimize efficiency and drive profitability.
One of the system's primary strengths lies in its inventory management capabilities. Through real-time monitoring and updates, businesses can maintain accurate stock records, track product availability, and automate replenishment processes. This ensures that businesses can effectively manage their inventory levels, minimize stock outs, and capitalize on sales opportunities.

Declaration by author

This project is composed of our original work and contains no material previously published or written by another person except where due reference has been made in the text. We have clearly stated the contribution of others to our project, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, financial support, and any other original research work used or reported in our software project. The content of our software project is the result of work we have carried out since the commencement of the Software project.

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Approval

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Contributions by authors to the project

List the significant and substantial inputs made by different authors to this research, work and writing represented and/or reported in the software project. These could include significant contributions to the conception and design of the project; non-routine technical work; analysis and interpretation of researchdata; drafting significant parts of the work or critically revising it to contribute to the interpretation.

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Conceptualization	50	50	100 %
Requirement analysis	30	70	100 %
Planning	40	60	100 %
Design	80	20	100 %
Implementation	0	100	100 %
Writing – original draft	80	20	100 %
Writing – review & editing	70	30	100 %

Table of Contents

List of Abbreviations and Symbols

Abbreviations	
POS	Point of Sell
VS Code	Visual Studio Code
JWT	JSON Web Token

Chapter 1

Introduction

In today's dynamic business landscape, the need for efficient and adaptable sales management solutions has never been greater. Enter the Online Point of Sale (POS) System – a comprehensive software solution meticulously crafted to revolutionize sales transaction management across diverse industries.

With its intuitive web-based interface, the Online POS System empowers businesses of all sizes to effortlessly conduct sales operations from any internet-enabled device. From small-scale retailers to expansive enterprises, this robust platform caters to a spectrum of needs with its seamlessly integrated features.

At the heart of the system lies its unparalleled inventory management capabilities. Through real-time monitoring and updates, businesses gain precise control over their stock records, ensuring optimal product availability and streamlined replenishment processes. This enables businesses to mitigate stock outs, capitalize on sales opportunities, and enhance profitability.

Moreover, the Online POS System goes beyond traditional transaction management by seamlessly integrating sales tracking and customer relationship management functionalities. This comprehensive approach not only optimizes operational efficiency but also fosters stronger customer connections, driving sustained growth and success.

The Online Point of Sale System stands as a testament to innovation in sales management, offering unparalleled flexibility, convenience, and performance to businesses seeking to thrive in today's competitive market landscape.

Our journey in developing the Online POS System involved not just envisioning a user-friendly platform accessible from any internet-enabled device, but also conducting comprehensive budget and risk assessments. We recognized early on the importance of not only delivering a robust solution but also ensuring its viability and resilience in the face of potential challenges.

By meticulously assessing budgetary requirements, we ensured the project remained on track financially, allocating resources efficiently to meet both short-term goals and long-term sustainability. Simultaneously, our proactive approach to risk assessment enabled us to identify potential hurdles and develop mitigation strategies, safeguarding the project's progress and integrity.

1.1 Scope

The scope of the project is much specified as it outlines an online point of sale to be incorporated in individual business models. Our system is divided into the following phases. These are:

1. Development of login system for system admin and user.
2. Development of a dashboard.
3. Customizable product category.
4. A page for available stocks and customizable stock.
5. Development of a sales page where products can be sold by admin upon manual customer add and track sale.
6. A manage expense page that shall show all the dues.
7. Customer Information page to keep track of customers.
8. A manageable user page that shall show all the users including their role and information.
9. Settings option.
10. Finally, a logout feature.

Admin holds the highest authority over the system. Admin is responsible for updating and modifying the existing system, ensuring data security and user authentication, cost fixing and assigning necessary roles and privileges to system users. Admin has the power to take away certain privileges assigned to us

Chapter 2

Proposed System

The web application to be built, an online point of sale service, enables its users to tackle the sale process at ease with multiple built-in features that results in a worthwhile experience for the user. Benefits of the proposed system:

1. 24/7 access availability to user.
2. Users can track the inventory.
3. Instant confirmation after payment.
4. Real-time stock information available to users.
5. Reduces waiting time for managing an order.
6. Hassle free cancellations.
7. Reduce the cost of the business.
8. Online payment option reducing crowd and queue in the business.
9. Fewer staff needed to manage.
10. Less number of calls to be made and less paperwork needed leading to monetary savings
11. Business is less crowded in rush hours.
12. Profile for the business which shall help in branding.

Chapter 3

Project Management

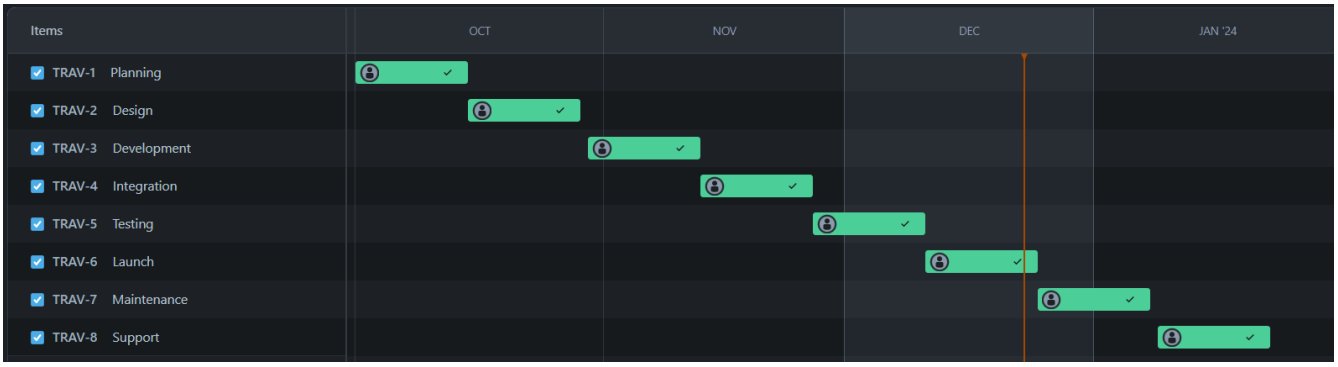
3.1 Operating environment

The system will be operated from the external Linux Server in which the site will be hosted. The hosting server will have 99.9% Uptime. This website is platform independent. User applications are accessible through different browsers such as Mozilla Firefox, Google Chrome, Opera, etc. This website is a web application which is hosted on Apache Server. The website will have a responsive design so that web pages can be rendered on a variety of devices.

3.2 Project period

The expected time of completion of the project is 6 months. At first, we estimated the time for planning to be one month, as this is a crucial part of the project. For designing the system architecture, creating wireframes, and prototyping the user interface, we estimated one month would be good enough. Development and testing purpose: 3 months after integrating various components and modules, we estimated two weeks. Finally, to launch the system, one week of preparation was expected. Maintenance and support would be ongoing if necessary.

3.3 Estimated project schedule



3.4 Estimated service cost

Description	Cost Assumption
Site launch (hosting)	27,000 BDT
Maintenance (1 year)	60,000 BDT
Developers	10,00,00 BDT
Grand total	**1,087,000 BDT**

3.5 Risk assessment

Risks	Probability	Impact
Missing deadlines on schedules	70%	B
The system fails to give the output as expected	60%	B
Project cancelled	30%	C
Un-important features added to the system	60%	B
Frustrated Team members	10%	D
Average	46% (likely)	

Impact value

A. Catastrophic

B. Critical

C. Marginal

D. Negligible

Where A=4, B=3, C=2, D=1

Risks	**Probability**	**Impact**	**Rating**	**RMMM**
Project cancelled	30%	4	Low	R-1
Developer did not understand the system	50%	3	Medium	R-2
Late completion of the project	50%	3	Medium	R-3
Un important features added to the system	40%	2	Low	R-4
The system failsto give the output as expected	60%	3	Medium	R-5
Missing deadlines on schedules	70%	1	High	R-6
Project managernot giving enough time for the project	50%	3	Medium	R-7
Customer satisfaction notthat level as expected	30%	4	Low	R-8

Chapter 4

Software requirements specification

4.1 Introduction

4.1.1 Intended audience: This online point of sale service will open for all the organizations that need the inventory management system. This system will be made for all ages as well. Both the organization and general people will benefit from this online point of sale service.

4.1.2 Intended use: People need to keep track of their businesses for the service such as track inventory, check daily order list, daily sale count, restocking product before it gets stock out and so on. Those who need to manage business with ease this online web-based system will be the easier way, comfortable and time saving. This system will be usable for every single person who has a basic knowledge of using internet.

4.1.3 User needs: Nowadays most people must manage their business and share business data with other stakeholders. But most of the processes are done manually. So, a simple, easier, and comfortable system is necessary for all. This proposed system will make business management easier. All can easily make business decisions, keep track of business at any time.

4.1.4 Assumption and dependencies: Some third-party software may be used to build up this project. These are free components; most of them are open source. We have used Edge browser, Mozilla Firefox, and Google Chrome etc. as web browsers to access the system. So, our project will not be affected because we are not using anything for which it becomes illegal to use.

Some open-source libraries and software's are used to build up this project:

a. Node.Js, Express.Js, Sequelize, MariaDB
b. React.Js, Tailwind CSS

Other dependencies:

c. The users have sufficient knowledge of computers.

d. The user's computer should have Internet connection and Internet server capabilities.

e. The users know the English language, as the user interface will be provided in English.

4.2 System Features

4.2.1 Admin:

1. Admin shall login to the system.
2. Access the dashboard.
3. View all the categories.
4. Add new categories.
5. Check available stock.
6. Add additional stock.
7. Process sales: The admin can manually enter customer details on behalf of the customer and place an order.
8. View the order list and print invoices.
9. Manage expenses through the due list.
10. View all customers and their order details.
11. Manage existing users and add new users.
12. Set a shop name.
13. Upload a shop profile picture.
14. Edit the tagline.
15. Logout from the system.

4.2.2 Registered customer:

1. Customers shall login to the system.
2. Browse and search for products.
3. Add products to the cart.
4. Place an order.
5. Make an online payment

4.2.3 Unregistered customer:

1. Users provide their information to the admin to initiate an order.

4.2.4 Categories:

1. View existing categories.
2. Add new categories

4.2.5 Stock:

1. All existing stocks shall be seen.
2. New stock shall be added.

4.2.6 Sale:

1. Admin can sell products.
2. View the order list.

4.2.7 Manage expense:

1. View all available due lists.

4.2.8 Customer Information:

1. Customers provided information's shall be seen except sensitive credentials.

4.2.9 Manage Users:

1. View existing users.
2. Add new users.

4.2.10 Payment module:

1. Keeping log of all transaction history
2. Individual client wise payment module
3. Security and authentication verification

4.2.11 Transaction Security:

1. Login/Registration/Authentication and Validation process

4.2.12 Authentication Security:

1. Login validation process using JWT Access Token.

4.3 System's Security Requirements

1. An SSL certificate must be obtained for the system as clients must pass personal and credit card, mobile and internet banking information from the website.
2. User authentication must be performed for all users to access the website.
3. A user must be a registered user to login to the system and use it.
4. Proper authentication is needed for any user to make transactions through the system.

4.4 Hardware Requirements

4.4.1 Server side:

1. 2 vCPU
2. 4 GB Ram
3. Ubuntu 20.04 (64 bit) Linux System
4. 80 GB SSD Storage
5. 3 TB Bandwidth

4.4.2 Client side:

6. 2 Core CPU Minimum
7. 2 GB Ram Minimum
8. Windows, MAC OS X, Linux, Android, iOS
9. Firefox, Google Chrome, Edge Browser or Any browser

4.5 Software Requirements

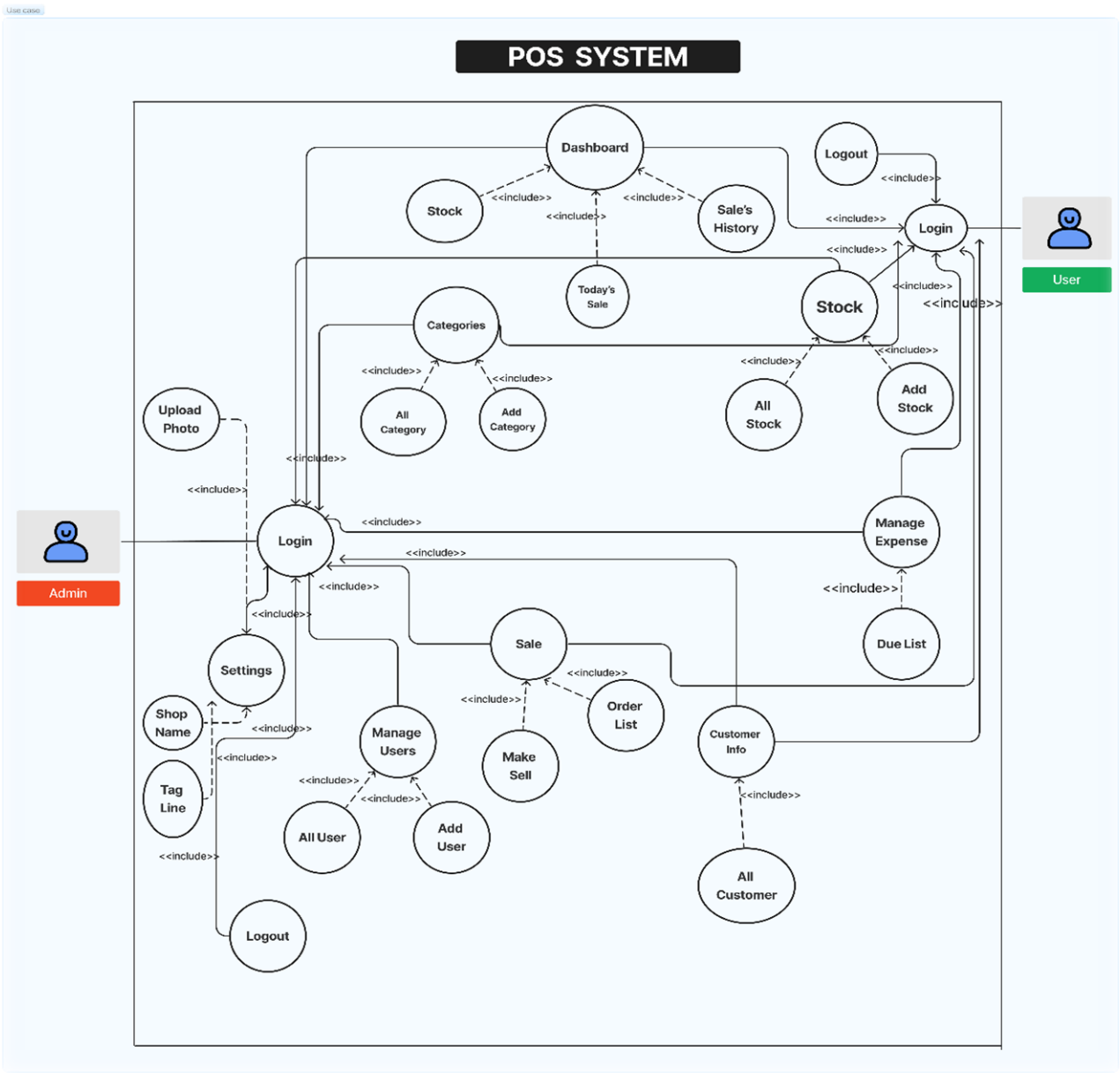
1. VS Code / Sublime Text / WebStorm or Any Text Editor or JavaScript and TypeScript Based IDE
2. Backend: NodeJs 18, ExpressJs, Sequelize, MariaDB
3. Frontend: ReactJs 18, Tailwind CSS
4. Design (UI/UX): Figma

Chapter 5

Diagram

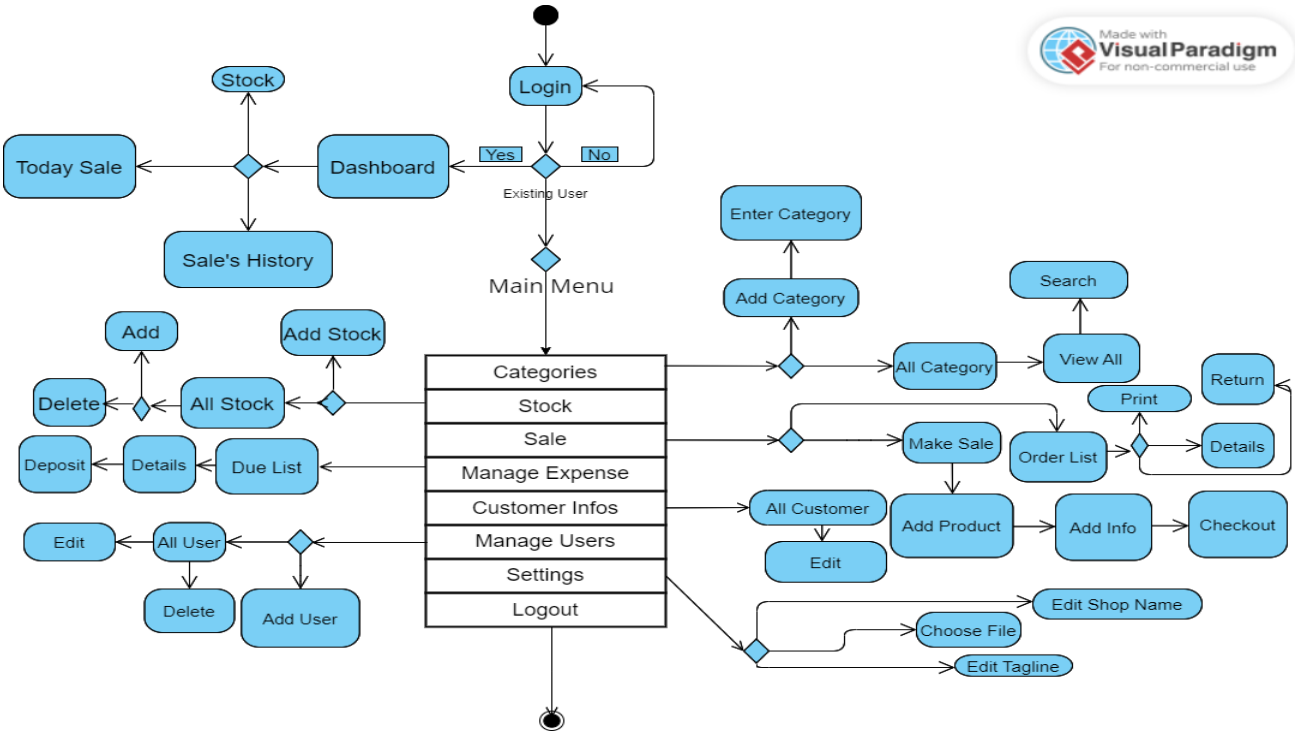
5.1 Use Case Diagram

A graphical representation of the interactions between actors.



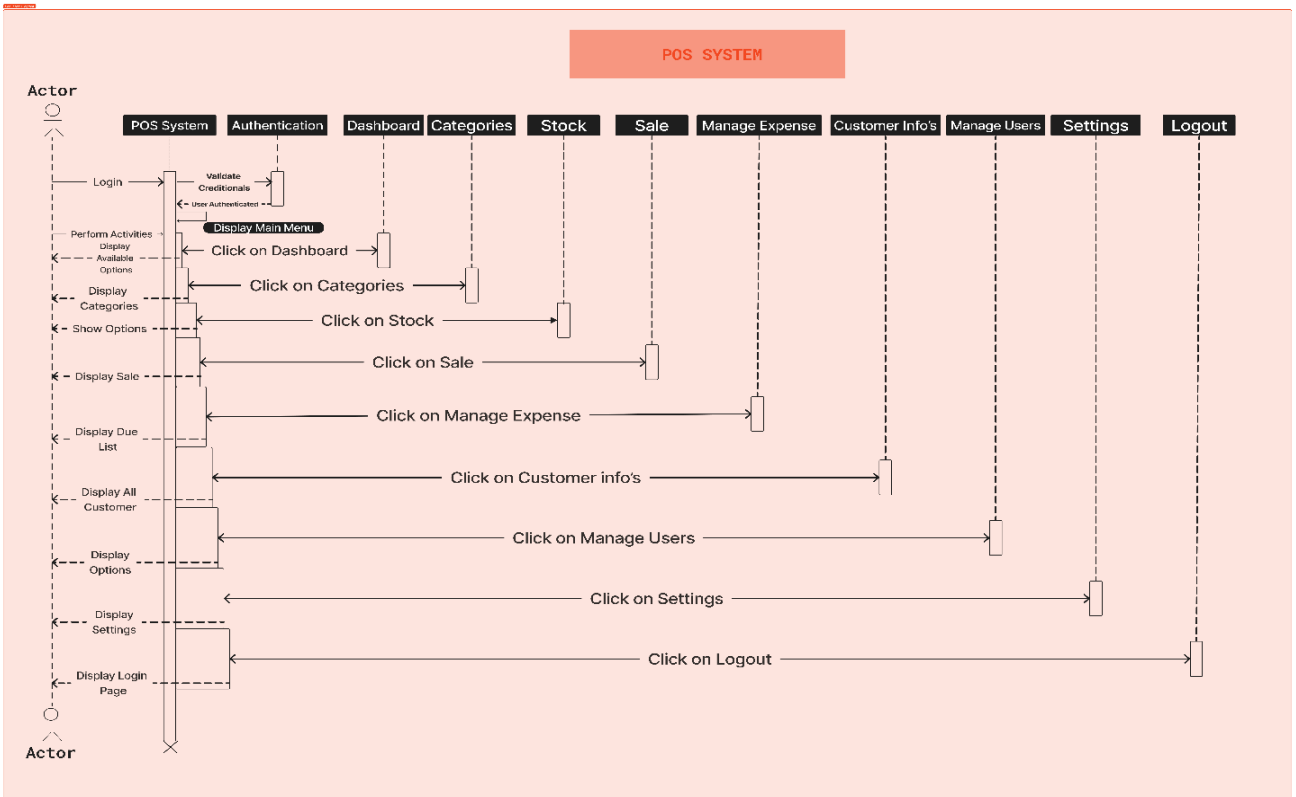
5.2 Activity Diagram

The flow of activities within the system or process.



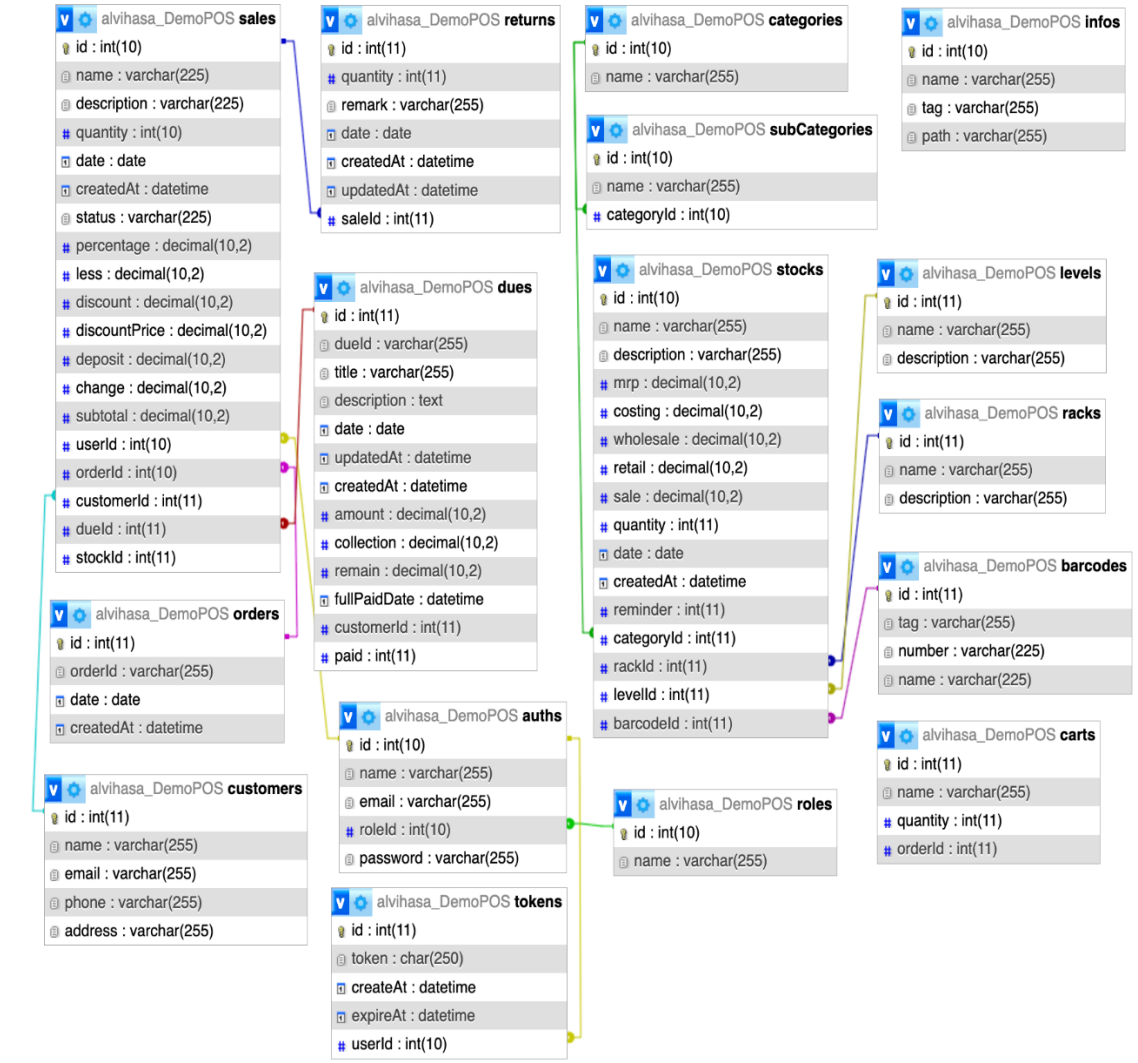
5.3 Sequence Diagram

The interactions between objects or components in a system over time



5.4 Database Diagram

A visual representation of a database structure.



Chapter 6

Demonstration

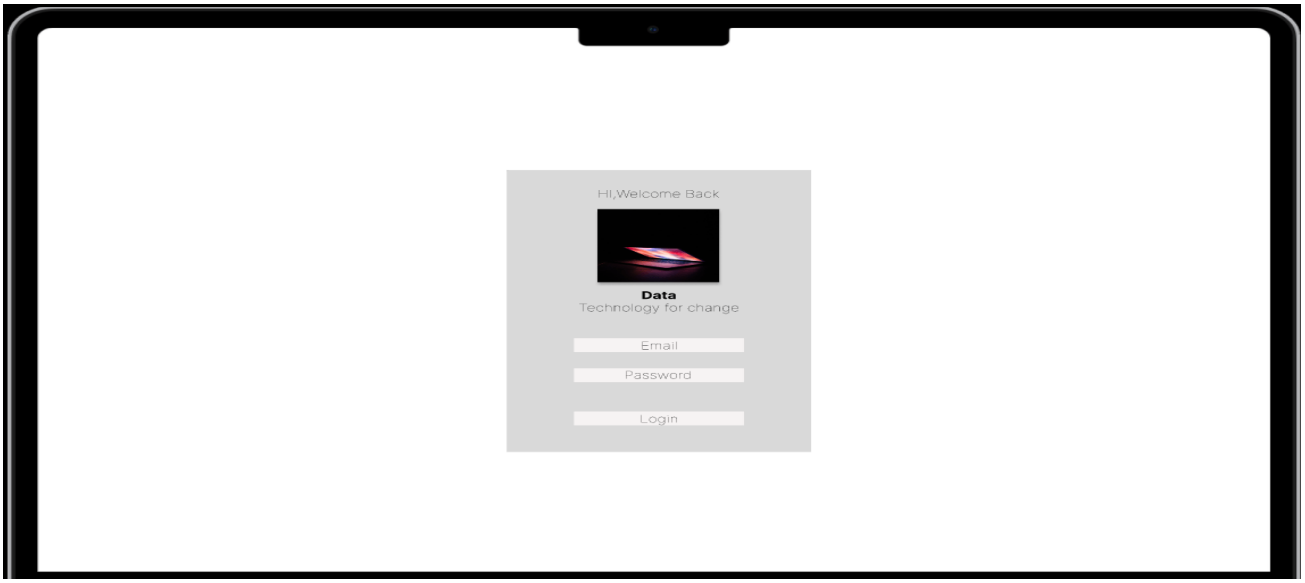


Figure 1: Website Landing Page

Figure 2: Website Home Page

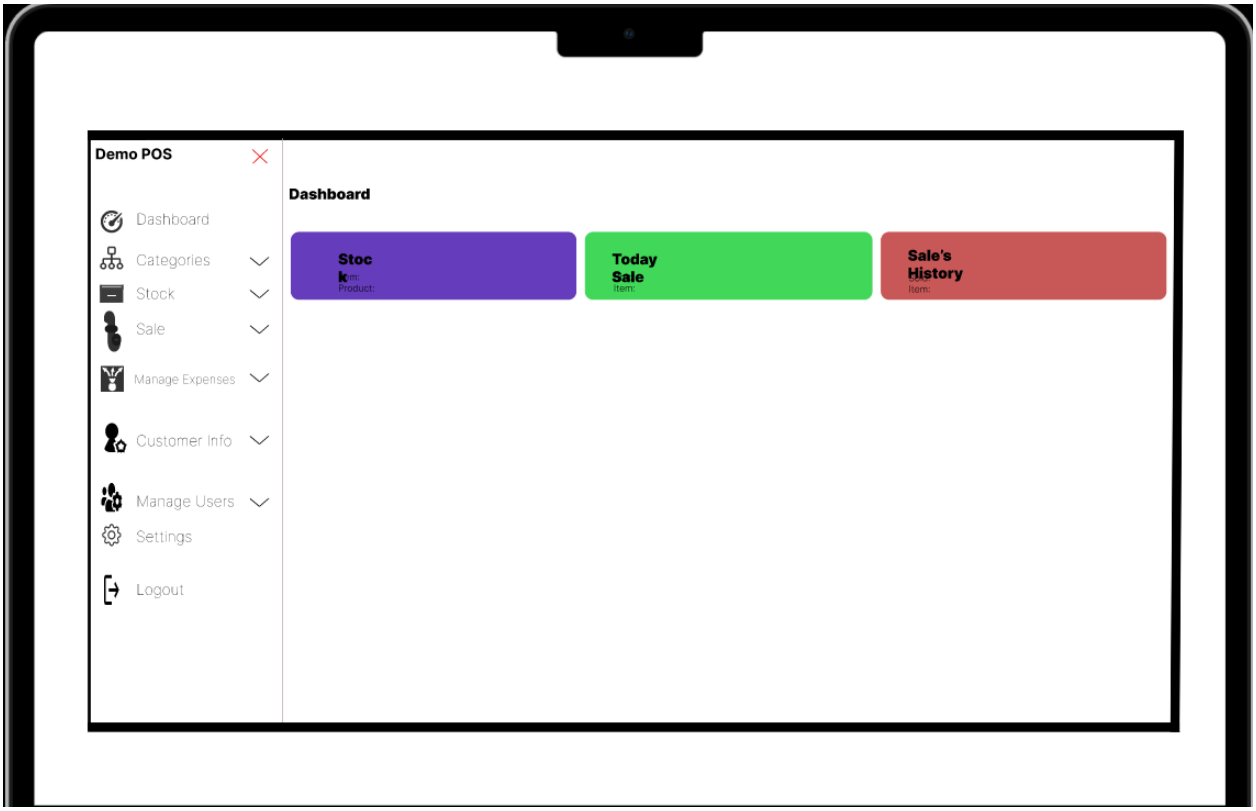


Figure 3: Website Features Page

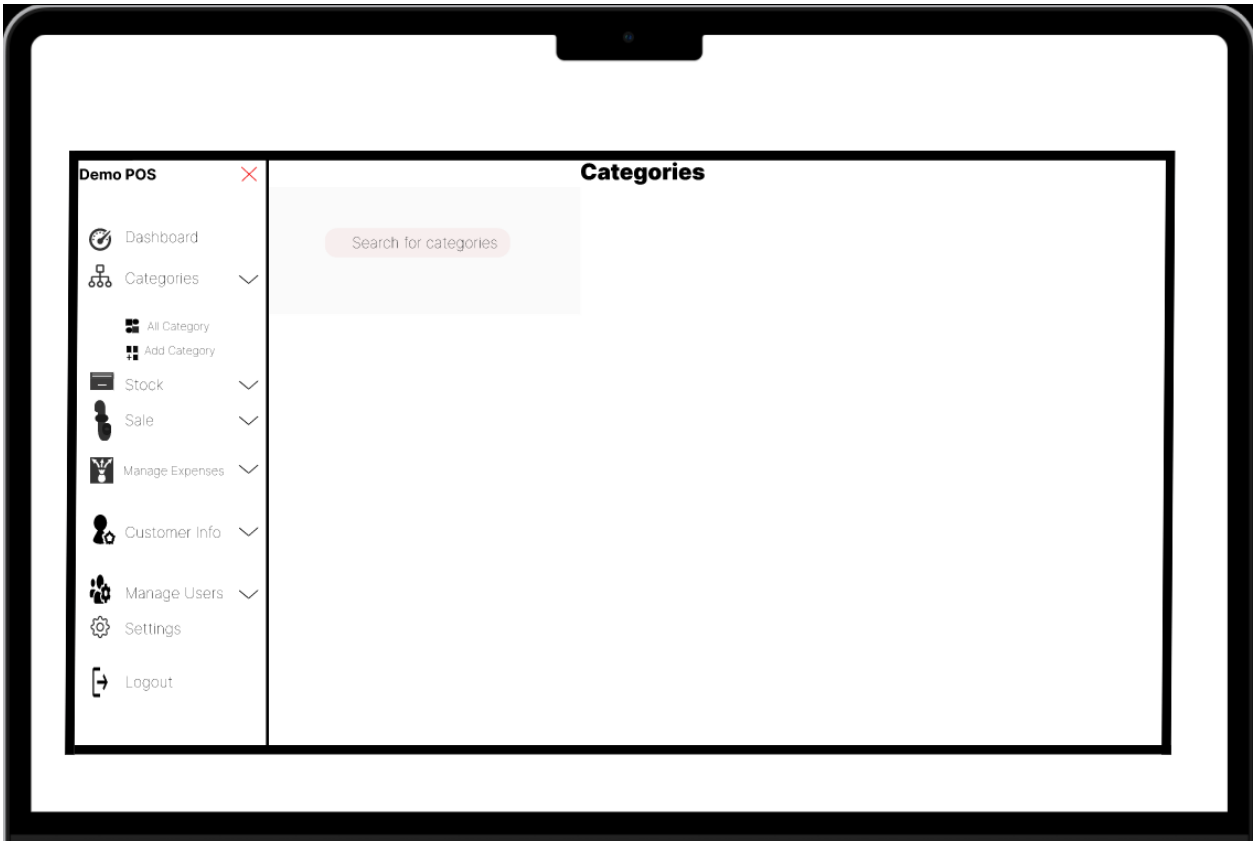


Figure 4: Website Categories Page

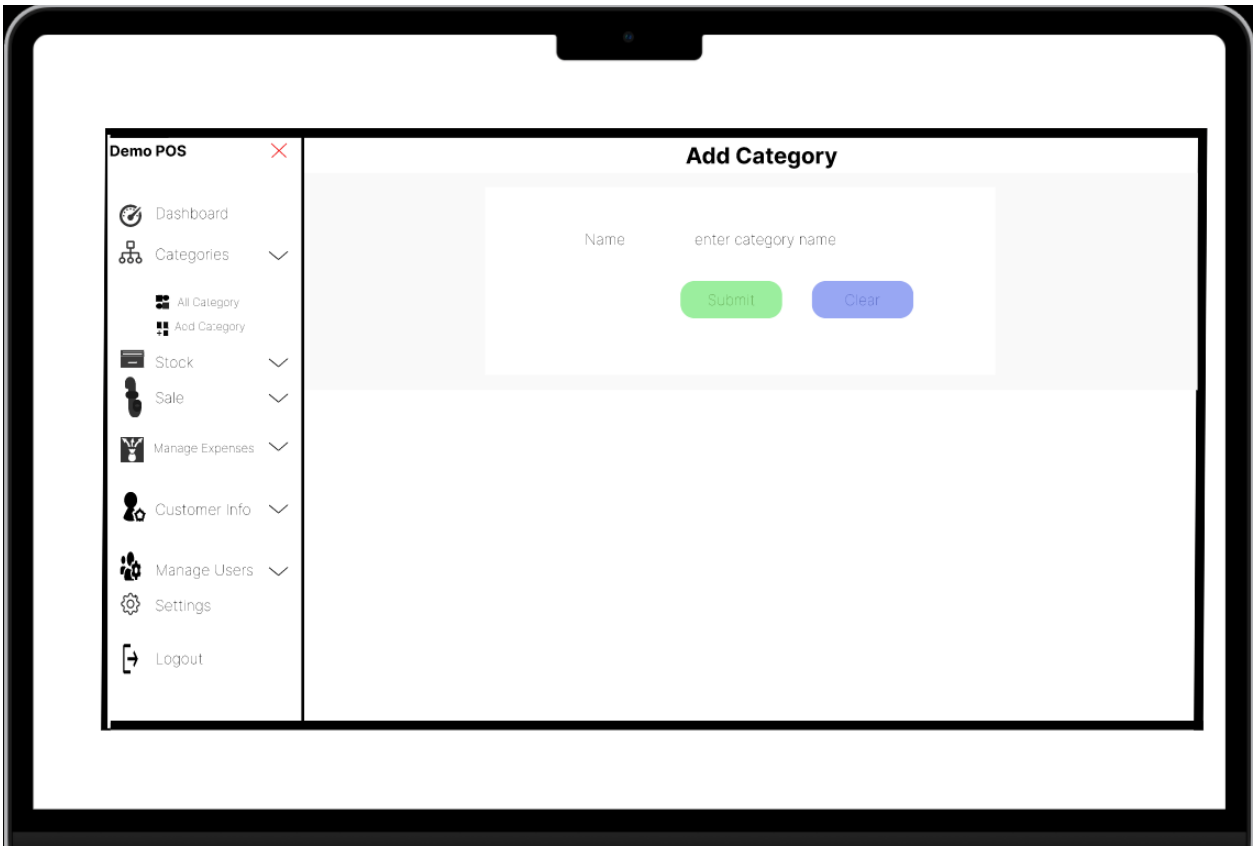


Figure 5: Website Add category Page

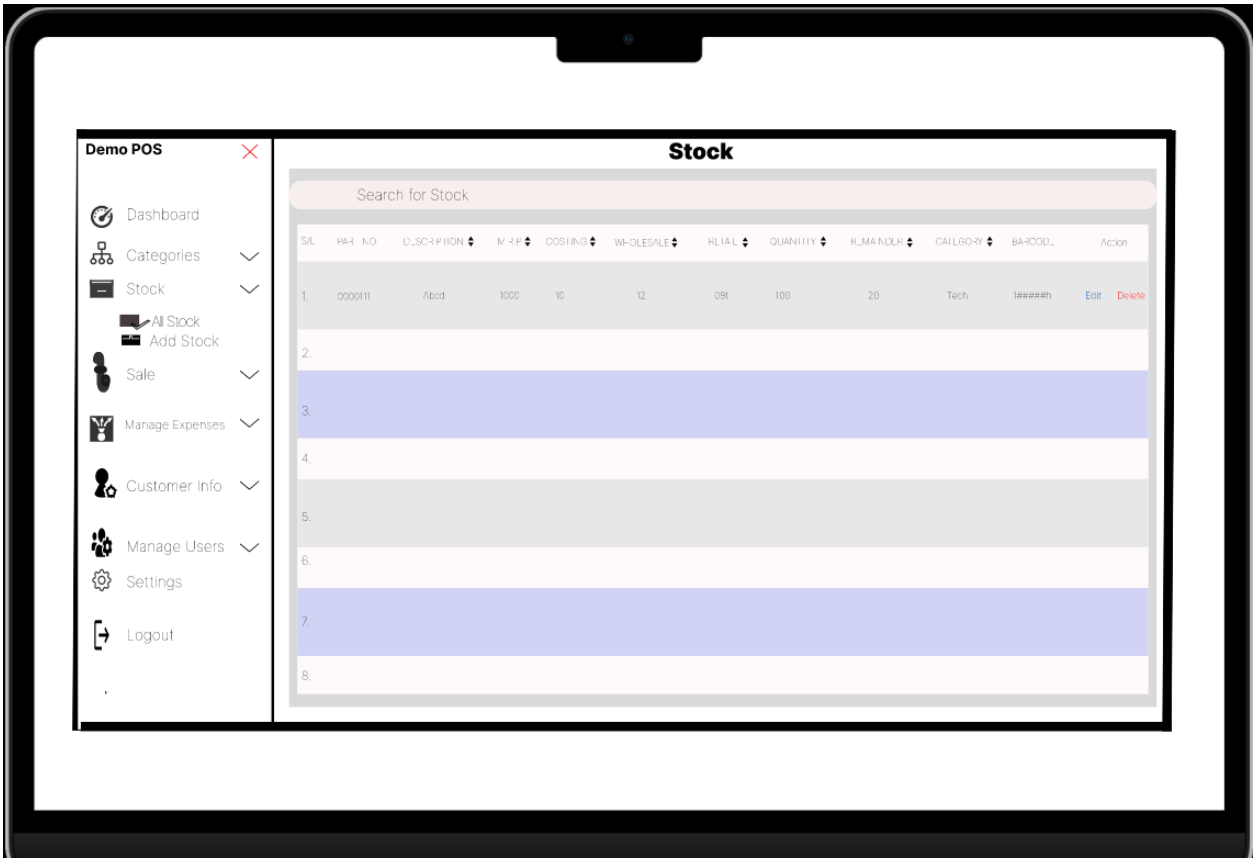


Figure 6: Website Stock Page

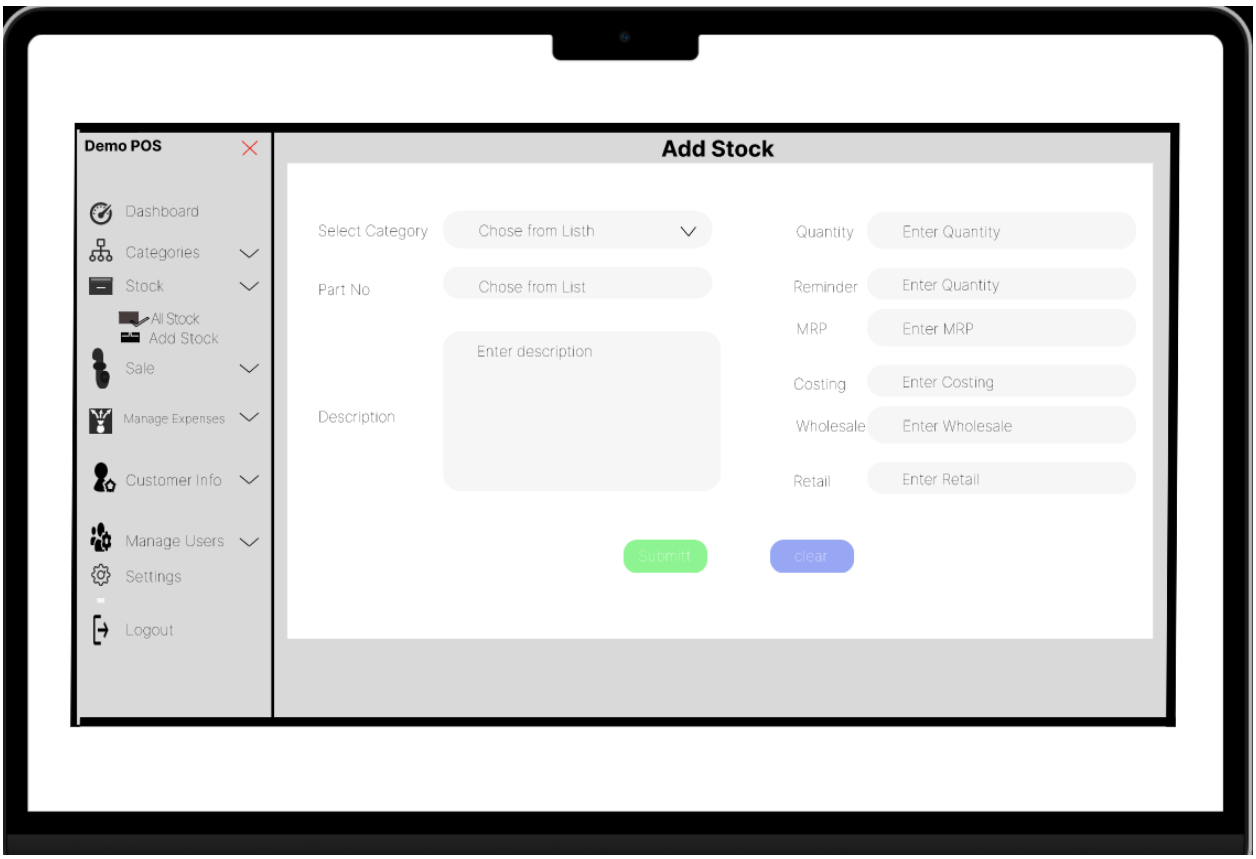


Figure 7: Website Add Stock Page

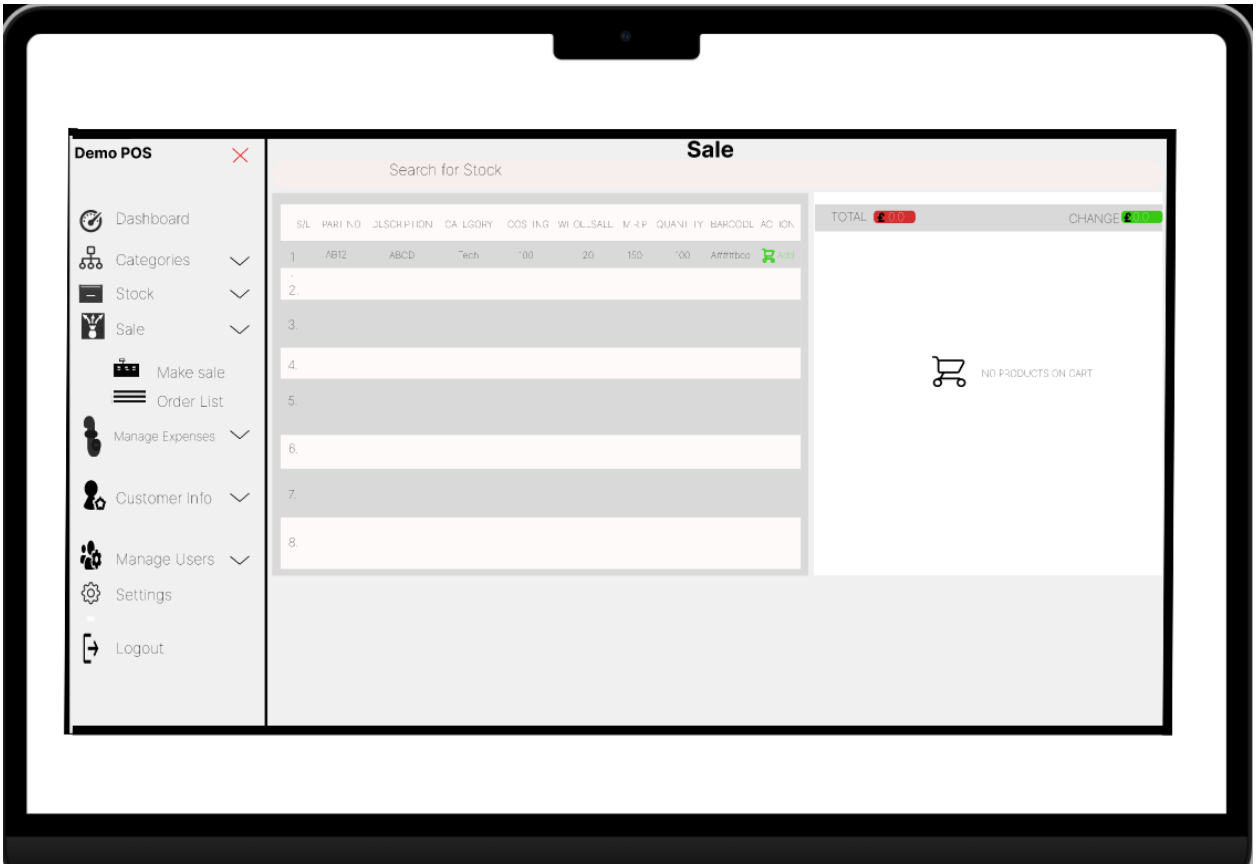


Figure 8: Website Sale Page

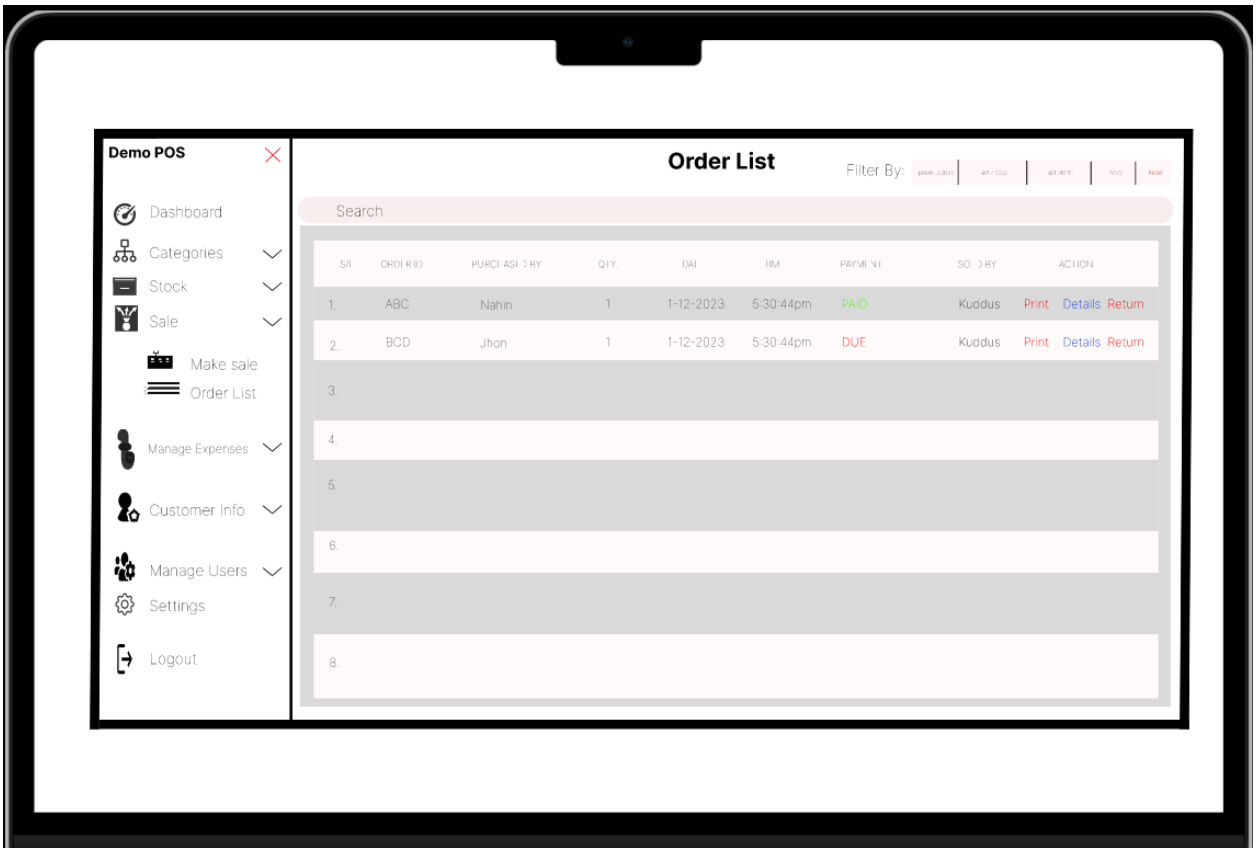


Figure 9: Website Order List Page

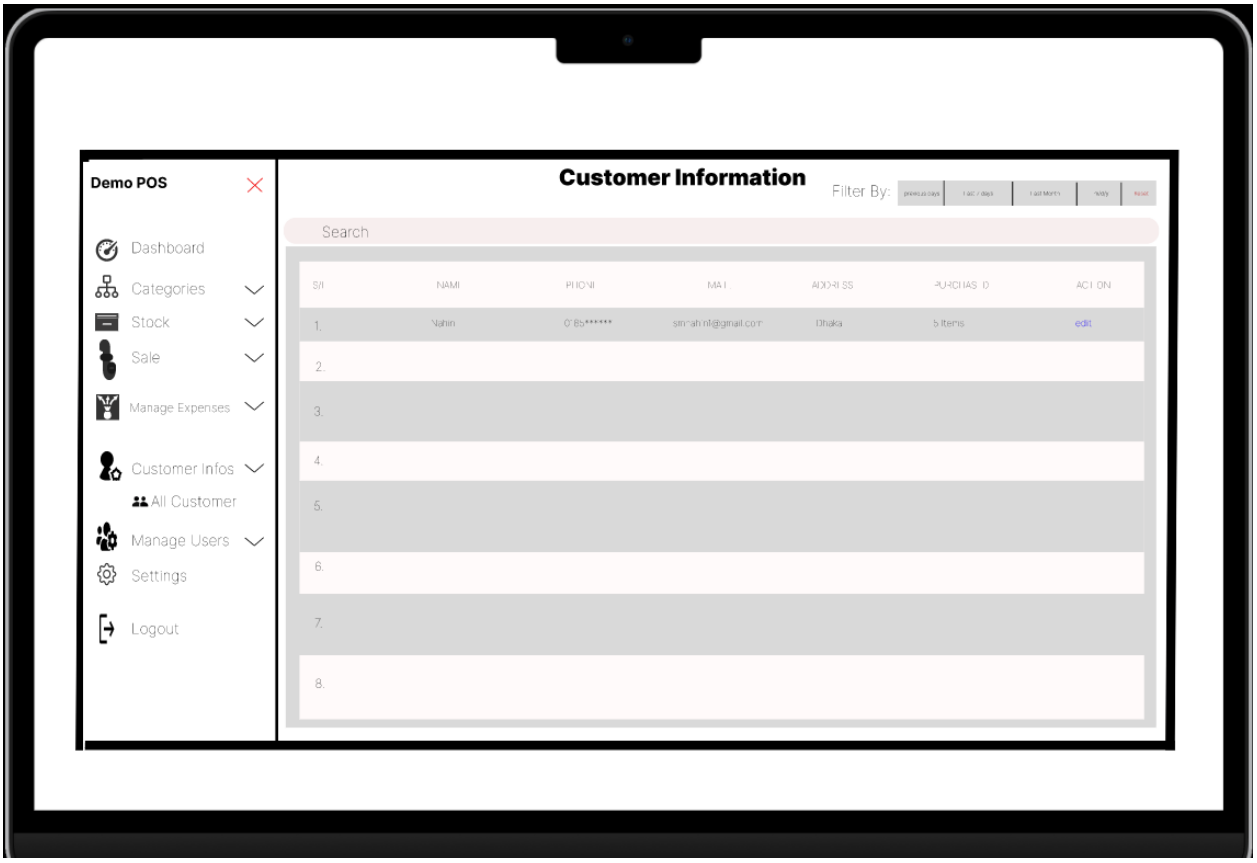


Figure 10: Website Customer Information Page

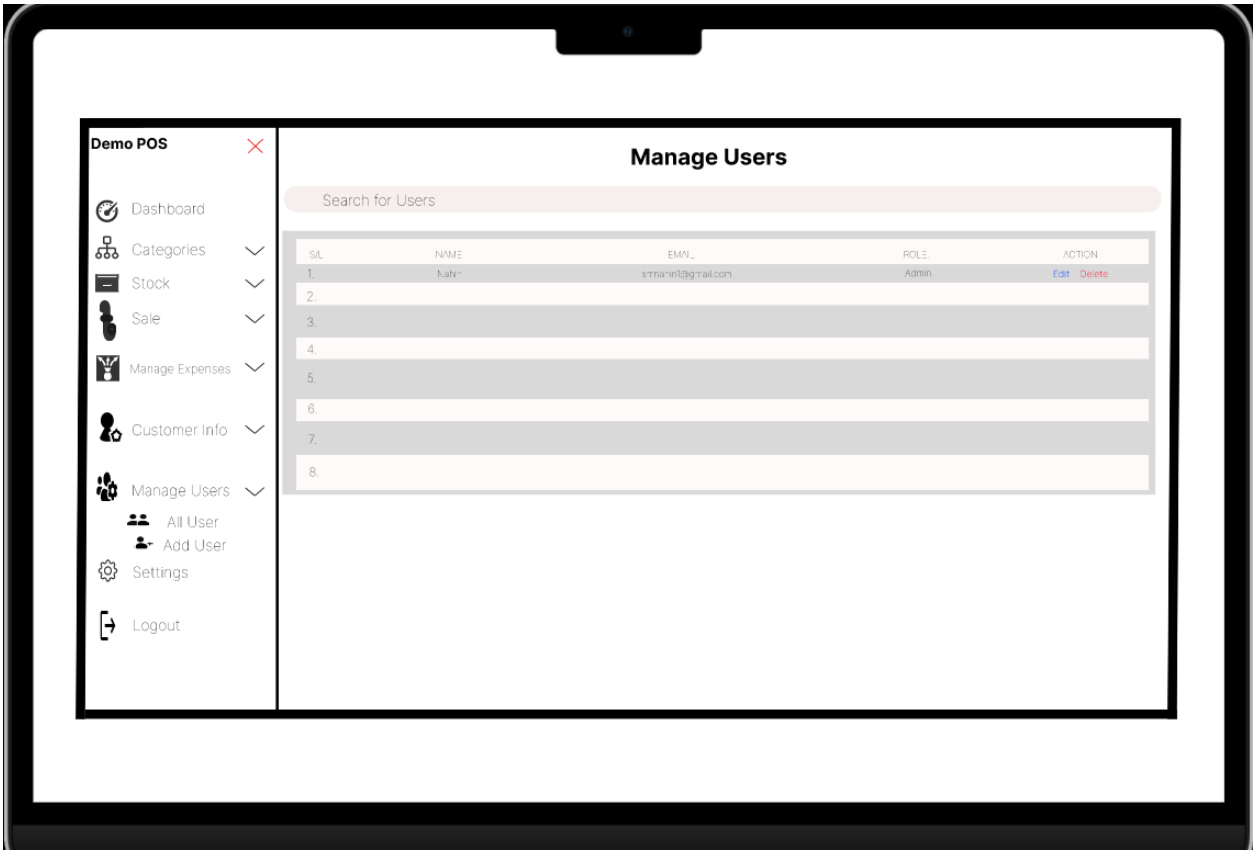


Figure 11: Website Manage Users Page

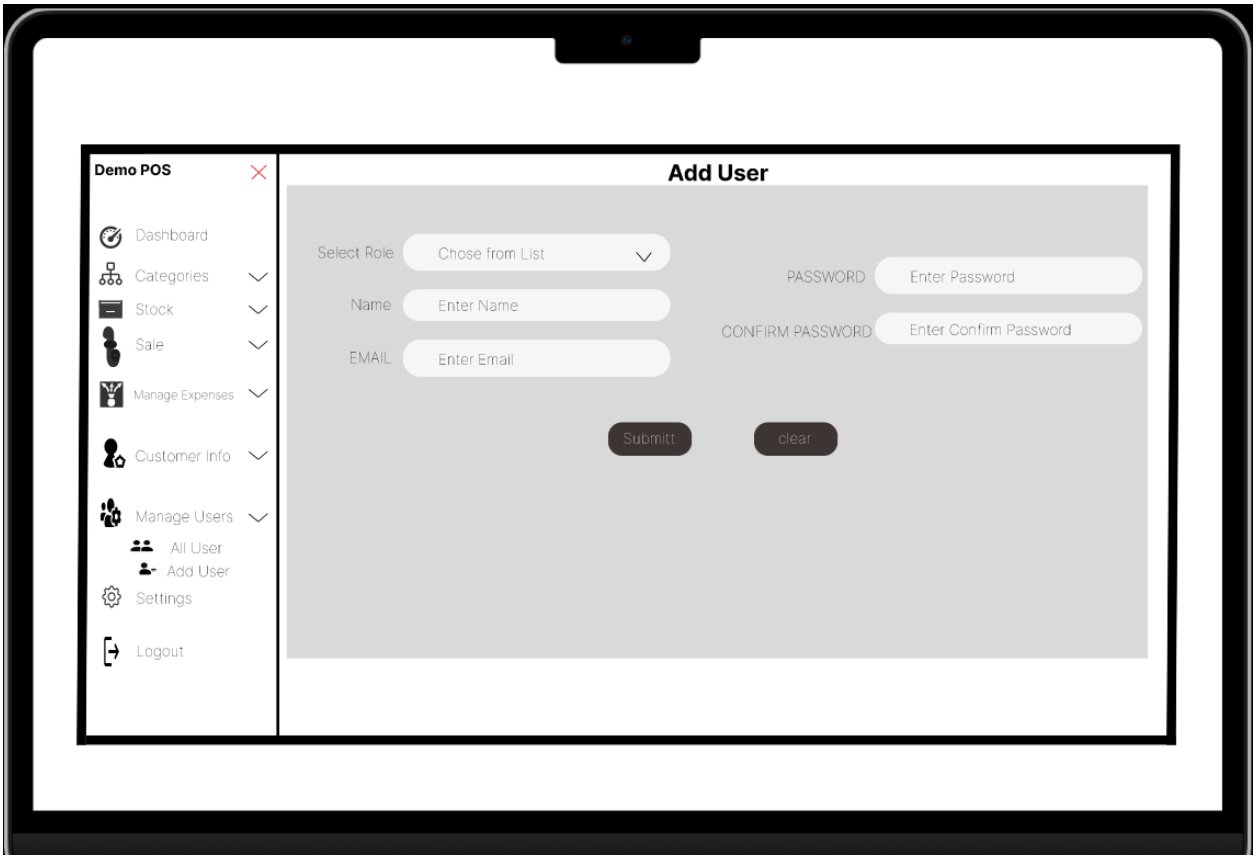


Figure 12: Website Add user Page

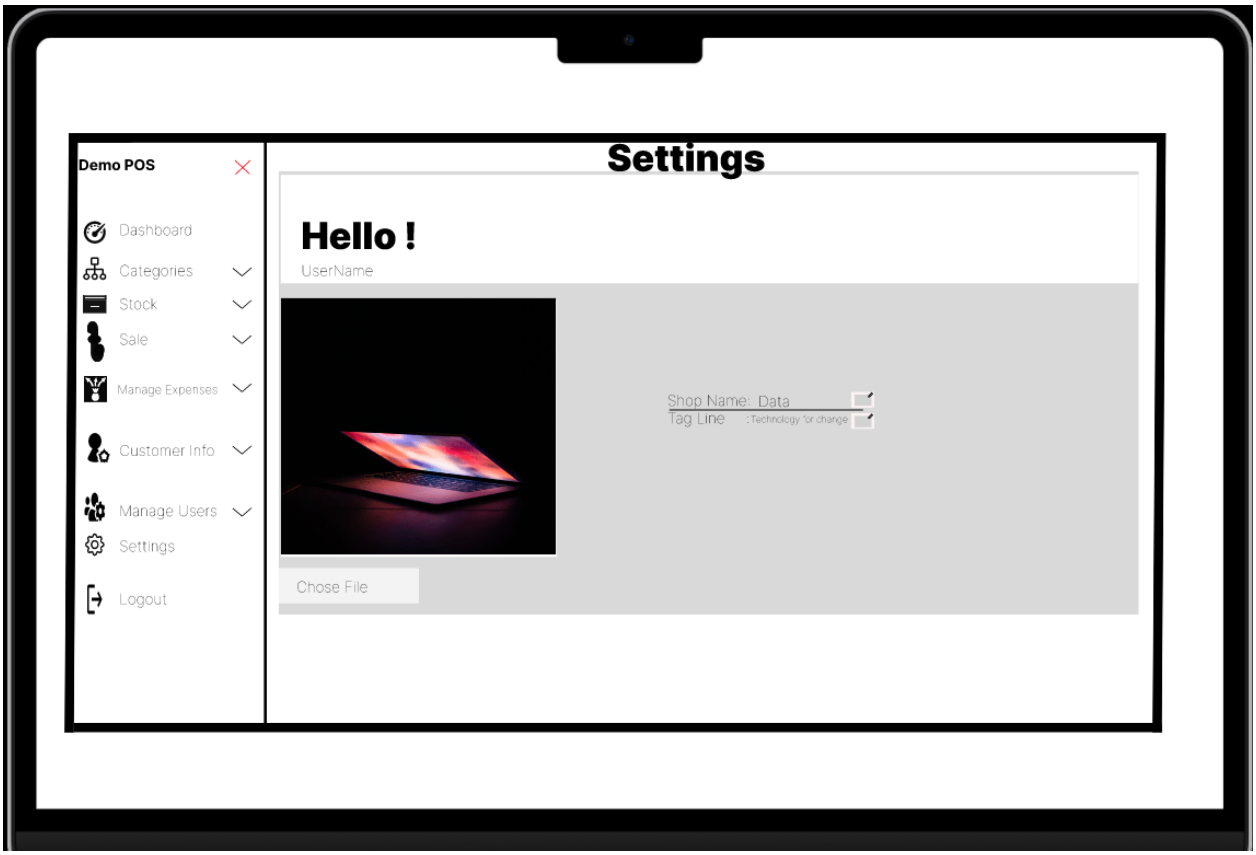


Figure 1: Website Settings Page

Chapter 6

Future work and conclusion

The Point of Sale (POS) system developed by us is a robust solution that efficiently handles sales transactions, inventory management, and customer interactions. It provides a user-friendly interface for cashiers to process transactions quickly and accurately, improving customer satisfaction and streamlining business operations. The system also offers features for generating reports, analyzing sales data, and managing inventory levels, empowering businesses to make informed decisions and optimize their operations.

In the future, we plan to integrate our Point of Sale (POS) system with online sales platforms for seamless synchronization, enhance reporting and analytics capabilities for deeper insights, develop a mobile POS application for increased flexibility, integrate CRM functionality to personalize marketing efforts, implement advanced security features to protect customer data, provide customization options for diverse business needs, and gather user feedback for continuous improvement.