Smart E-Commerce Management System For Efficient Online Business Operations

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APPROVAL

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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Salma Tabashum**, **Lecturer** and **Coordinator,** Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this thesis has been or is being submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The rapid growth of Information and Communication Technology (ICT) has significantly transformed the way businesses operate, making Electronic Commerce (E-Commerce) an essential part of the modern digital economy. Online shopping platforms provide customers with convenient access to products and services while enabling businesses to manage sales, inventory, and customer relationships more efficiently. However, many small and medium-sized businesses still face challenges in managing products, customer information, orders, and payments due to the lack of an integrated and automated management system.

This project presents the design and development of an E-Commerce Management System, a web-based application that provides a complete solution for managing online business operations. The system includes separate modules for customers and administrators. Customers can register, log in, browse products, search items, add products to the shopping cart, place orders, and view their order history. Administrators can manage products, categories, customers, orders, payments, and other business information through a secure and user-friendly dashboard.

The system has been developed using PHP, MySQL, HTML5, CSS3, JavaScript, Bootstrap, and AJAX following standard software engineering principles. A relational database has been implemented to ensure efficient data storage, integrity, and security. The application was tested to verify the functionality of all modules, ensuring reliable performance, accurate data management, and a smooth user experience.

The proposed system simplifies business operations by reducing manual work, improving order processing, and enhancing customer satisfaction. It also provides a scalable foundation for future enhancements such as online payment gateway integration, mobile application support, product reviews, and AI-based product recommendation features. This project demonstrates the practical implementation of modern web technologies in developing a secure, efficient, and user-friendly E-Commerce Management System suitable for small and medium sized businesses.

ACKNOWLEDGMENT

At the very beginning, we would like to express my deepest gratitude to the Almighty god for giving us the ability and the strength to finish the task successfully within the scheduled time.

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Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love.

LIST OF ABBREVIATIONS

AJAX	Asynchronous JavaScript and XML
API	Application Programming Interface
CMS	Content Management System
CSS	Cascading Style Sheets
CRUD	Create, Read, Update, Delete
DBMS	Database Management System
ERD	Entity Relationship Diagram
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
ICT	Information and Communication Technology
ID	Identification
JS	JavaScript
JSON	JavaScript Object Notation
MVC	Model-View-Controller
MySQL	My Structured Query Language
OOP	Object-Oriented Programming
OTP	One-Time Password
PDF	Portable Document Format
PHP	Hypertext Preprocessor
RDBMS	Relational Database Management System
SQL	Structured Query Language
UI	User Interface
URL	Uniform Resource Locator
UX	User Experience
WWW	World Wide Web

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CHAPTER 1
INTRODUCTION ABOUT THIS PROJECT

1.1 Introduction

Electronic Commerce (E-Commerce) has become one of the fastest-growing sectors in the modern digital economy. It enables businesses to buy and sell products and services through the Internet, providing customers with a convenient and efficient shopping experience. With the rapid advancement of Information and Communication Technology (ICT), online business has become an essential part of everyday life.

In Bangladesh, the popularity of online shopping has increased significantly due to the availability of smartphones, affordable internet services, and digital payment methods. Customers now prefer purchasing products online because it saves time, offers a wide variety of products, and provides home delivery services. As a result, businesses require efficient software solutions to manage products, customers, inventory, and orders.

The E-Commerce Management System developed in this project is a web-based application that automates online business operations. The system allows customers to register, browse products, add items to the shopping cart, place orders, and track purchases. It also provides an administrative dashboard where the administrator can manage products, categories, customers, orders, payments, and other business activities.

The project has been developed using PHP, MySQL, HTML, CSS, JavaScript, and Bootstrap to provide a secure, user-friendly, and efficient online shopping platform.

1.2 Why is it important?

The growth of e-commerce has transformed the way businesses operate by providing faster and more convenient services to customers. An E-Commerce Management System helps organizations automate daily business activities, reduce paperwork, improve data accuracy, and increase operational efficiency.

For customers, the system provides easy product searching, secure account management, online ordering, and order tracking. For business owners, it offers centralized control over products, inventory, customer information, payments, and sales reports. As online businesses continue to expand, such management systems play an essential role in improving customer satisfaction and supporting business growth.

1.3 Objectives of Project Work

The primary objective of this thesis is to design and develop a secure, efficient, and user-friendly E-Commerce Management System that simplifies online shopping and business management. The system aims to provide customers with a convenient platform for purchasing products while enabling administrators to manage products, customers, orders, and payments through a centralized dashboard:

Specific Objectives

1. To develop a secure web-based E-Commerce application.
2. To implement user registration and authentication.
3. To manage products and categories efficiently. .
4. To provide shopping cart and order management facilities.
5. To simplify payment and delivery management.
6. To develop an admin panel for business management.
7. To improve customer satisfaction through an easy-to-use interface.

1.4 Literature Review

E-Commerce has become an important research area due to its significant impact on modern business. Many researchers have developed online shopping systems to improve customer experience and business efficiency. Existing studies show that web-based management systems reduce manual work, improve inventory management, and simplify order processing.

Several popular E-Commerce platforms such as Amazon, eBay, Daraz, and Alibaba provide advanced features including online payment, order tracking, product recommendations, and customer reviews. These systems have demonstrated how technology can improve business operations and customer satisfaction.

Previous research also highlights the importance of secure authentication, database management, responsive web design, and efficient order processing in developing successful E-Commerce applications. However, many existing systems are either expensive, difficult to customize, or contain unnecessary features for small and medium-sized businesses.

The proposed E-Commerce Management System has been developed to provide a simple, secure, and cost-effective solution. It integrates product management, customer management, shopping cart, order processing, payment management, and administrative control into a single web-based application suitable for small and medium-sized businesses.

1.5 Real Life Applications

E-Commerce Management Systems are widely used in different industries to simplify business operations and improve customer service. Online shopping platforms allow businesses to reach customers beyond geographical boundaries while providing fast and secure transactions.

- **Some common real-life applications include:**

  - Online retail stores
  - Fashion and clothing businesses
  - Grocery and supermarket management
  - Electronics and mobile shops
  - Pharmacy and healthcare stores
  - Book and stationery shops
  - Furniture and home appliance businesses

These systems help businesses manage products, customers, orders, inventory, and payments efficiently while providing customers with a convenient online shopping experience.

1.6 System Overview

The proposed E-Commerce Management System is a web-based application designed for both customers and administrators. Customers can create an account, log in, browse products, search for items, add products to the shopping cart, place orders, and view order history.

The administrator has complete control over the system through a secure dashboard. The admin can manage products, categories, customers, manufacturers, orders, coupons, shipping information, and payments. The system automatically stores all information in a MySQL database, ensuring secure and efficient data management.

The application has been developed using PHP, MySQL, HTML, CSS, JavaScript, Bootstrap, and AJAX, providing a responsive and user-friendly interface.

1.7 Contributions of the Proposed System

The proposed E-Commerce Management System has been developed to provide a complete and efficient solution for managing online business activities. The system integrates multiple modules that simplify business operations, improve customer experience, and reduce manual work. The major contributions of this project are described below.

1.7.1 Customer Management Module

The system provides a secure customer registration and login facility. Customers can create personal accounts, update their profiles, browse products, add items to the shopping cart, place orders, and view their order history. This module improves the overall online shopping experience.

1.7.2 Product and Category Management

The administrator can easily add, edit, update, and delete product information. Products are organized into different categories, making it easier for customers to search and browse items. This module helps maintain an organized product catalog and simplifies inventory management.

1.7.3 Shopping Cart and Order Management

The system allows customers to add products to a shopping cart before placing an order. Once an order is confirmed, the administrator can process, update, and monitor the order status. This feature ensures efficient order handling and improves customer satisfaction.

1.7.4 Payment and Admin Dashboard

The administrator dashboard provides complete control over the system. It allows administrators to manage customers, products, categories, payments, shipping information, and sales records from a single interface. This centralized management system improves business efficiency and supports better decision-making.

CHAPTER 2
SYSTEM ANALYSIS AND REQUIREMENT SPECIFICATION

2.1 Introduction

System analysis is one of the most important phases of software development. It helps identify the requirements of the proposed system and provides a clear understanding of how the system will function. A proper requirement analysis ensures that the developed software meets user expectations and business needs while reducing future development issues.

The proposed E-Commerce Management System has been analyzed based on the requirements of both customers and administrators. The system is designed to provide a secure, efficient, and user-friendly environment where customers can purchase products online, while administrators can manage products, orders, customers, and payments through a centralized dashboard.

The analysis process involved identifying the functional requirements, non-functional requirements, hardware and software requirements, and the overall feasibility of the system. These requirements serve as the foundation for designing and implementing the proposed application".



Figure 2.1: Requirement Analysis Process

2.2 Requirement Analysis

Requirement analysis is the process of identifying the needs of users and defining the features that the system must provide. It helps developers understand how the application should perform and ensures that all essential functionalities are included.

For this project, requirements were collected by studying existing e-commerce websites, reviewing related research, and analyzing the expected needs of customers and administrators. The collected requirements were then categorized into functional and non-functional requirements.

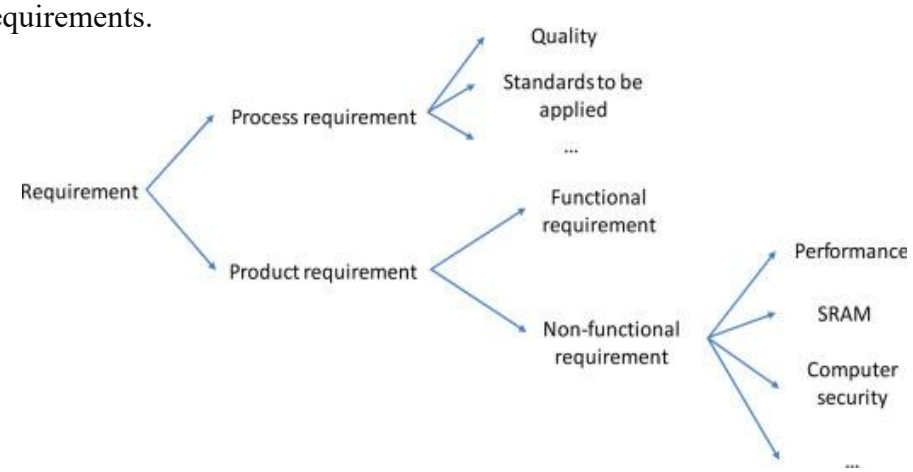


Figure 2.2: Requirement Collection Process

2.3 Functional Requirements

Functional requirements describe the core operations that the system must perform. These features ensure that both customers and administrators can use the application efficiently.

Module	Description
User Registration	Customers can create a new account.
User Login	Registered users can securely log in.
Product Management	Admin can add, edit, update, and delete products.
Category Management	Products are organized into categories.
Shopping Cart	Customers can add and remove products.
Order Management	Customers can place orders and view order history.
Payment Management	Admin can manage payment information.
Customer Management	Admin can manage customer accounts.
Search Function	Customers can search for products easily.

Table 2.3 Functional Requirements

2.4 Non-Functional Requirements

Non-functional requirements define the quality and performance characteristics of the system.

Requirement	Description
Performance	The system should respond quickly to user requests.
Security	User information must be protected through authentication.
Reliability	The system should operate without major failures.
Usability	The interface should be simple and user-friendly.
Scalability	New features can be added in the future.
Availability	The system should be accessible whenever needed.

Table 2.4 Non-Functional Requirements

2.5 Hardware and Software Requirements

The successful implementation of the proposed E-Commerce Management System requires suitable hardware and software resources. These requirements ensure that the system performs efficiently and provides a smooth user experience during development and deployment.

Component	Specification
Processor	Intel Core i3 or Higher
RAM	Minimum 4 GB
Storage	100 GB Free Disk Space
Monitor	1366 × 768 Resolution
Internet	Broadband Connection

Table 2.5 Hardware Requirements

Software	Version/Purpose
Operating System	Windows 10/11
Programming Language	PHP
Database	MySQL
Web Server	XAMPP
Front-end	HTML5, CSS3, Bootstrap, JavaScript
Browser	Google Chrome / Microsoft Edge
Code Editor	Visual Studio Code

Table 2.5.1 Software Requirements

.

2.6 Feasibility Analysis

Before developing the system, a feasibility study was conducted to determine whether the project was practical and beneficial. The study evaluated the system from technical, economic, and operational perspectives.

2.6.1 Technical Feasibility

The proposed system is technically feasible because it is developed using widely used technologies such as PHP, MySQL, HTML, CSS, JavaScript, and Bootstrap. These technologies are open-source, easy to maintain, and suitable for developing dynamic web applications

2.6.2 Economic Feasibility

The development cost of the system is relatively low because all development tools and software used are freely available. The system helps reduce paperwork, minimizes manual effort, and improves business efficiency, making it a cost-effective solution for small and medium sized businesses

.

2.6.3 Technical Feasibility

The system has been designed with a simple and user-friendly interface so that both customers and administrators can operate it without requiring advanced technical knowledge. This ensures that the application can be adopted easily in real business environments

Feasibility Type	Result
Technical	Feasible
Economic	Feasible
Operational	Feasible

Table 2.6 Feasibility Analysis Summary

CHAPTER 3
SYSTEM DESIGN

3.1 Introduction

System design is an essential phase of software development that transforms the requirements identified during system analysis into a structured design. It provides a clear blueprint for implementing the proposed application by defining the system architecture, database structure, user interface, and interactions between different modules

.

The proposed E-Commerce Management System has been designed to provide a secure, efficient, and user-friendly environment for both customers and administrators. The system architecture follows a modular approach, allowing different components such as customer management, product management, shopping cart, order processing, and payment management to work together efficiently. This design improves maintainability, scalability, and overall system performance.

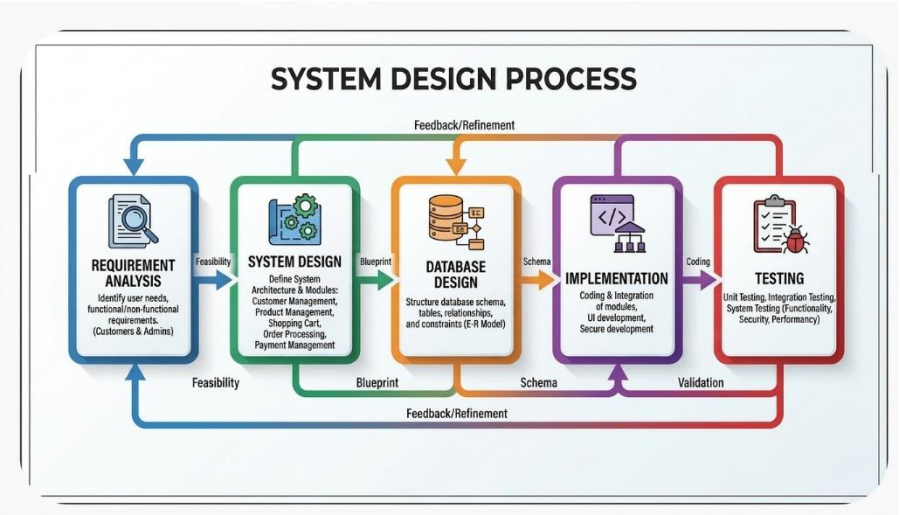


Figure 3.1 Overall System Design Process

3.2 System Architecture

The proposed system follows a three-tier architecture consisting of the Presentation Layer, Application Layer, and Database Layer.

The Presentation Layer is responsible for interacting with users through a web browser. Customers can browse products, manage their shopping cart, and place orders, while administrators can manage products, customers, and orders using the admin dashboard.

The Application Layer contains the business logic of the system. It processes user requests, validates input, manages authentication, calculates order information, and communicates with the database

The **Database Layer** stores all business information including customer details, products, categories, orders, payments, shipping information, and administrator records. MySQL is used as the relational database management system because of its reliability and efficiency.

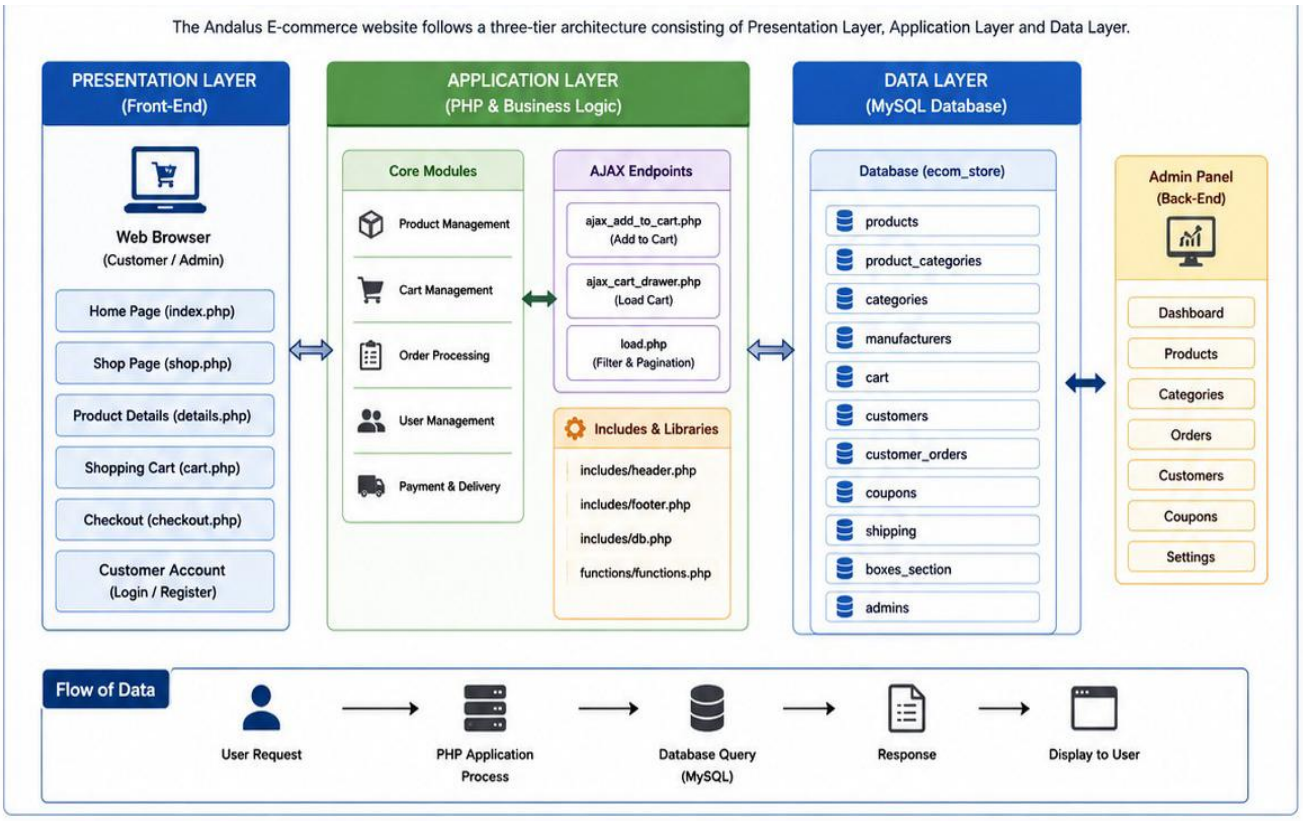


Figure 3.2 System Architecture

3.3 Use Case Diagram

The Use Case Diagram illustrates how users interact with the proposed system. There are two main actors: Customer and Administrator.

The Customer can register, log in, browse products, search products, add items to the shopping cart, place orders, and view order history. The Administrator can manage products, categories, customers, orders, payments, and generate invoice.

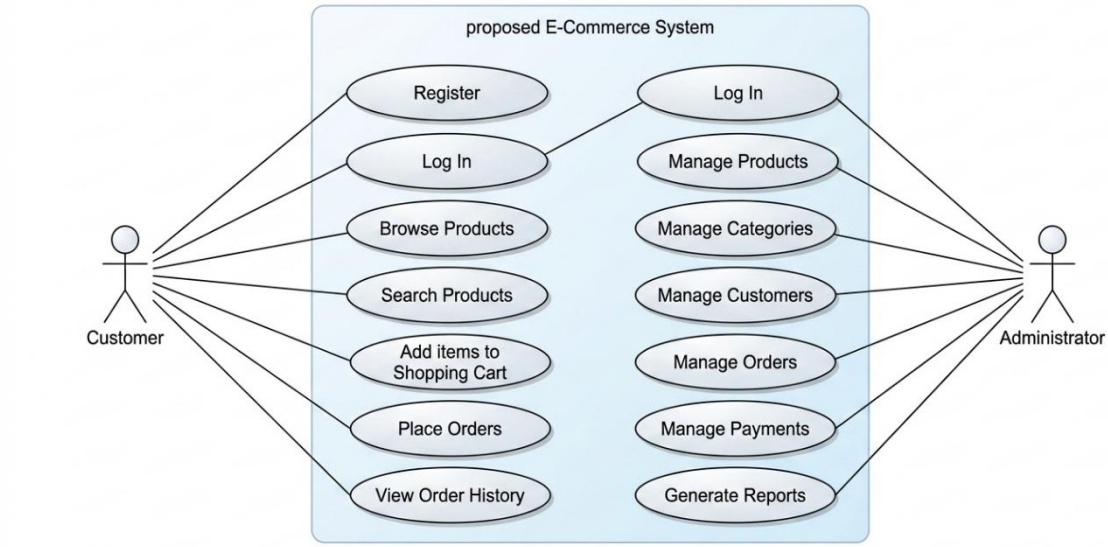


Figure 3.3 Use Case Diagram

3.4 Data Flow Diagram (DFD)

The Data Flow Diagram (DFD) represents the movement of information between users, the application, and the database. It explains how customer requests are processed and how information is stored and retrieved.

The customer submits requests such as registration, login, or product orders through the website. The application processes these requests and communicates with the database to store or retrieve information. Similarly, the administrator manages products, customers, and orders through the admin panel.



Figure 3.4 Data Flow Diagram

3.5 Flowchart of the System

The system flow begins when a customer visits the website. The customer can browse products or log into the system. After selecting products, the customer adds them to the shopping cart and proceeds to checkout. The order information is stored in the database, and the administrator processes the order through the admin dashboard.

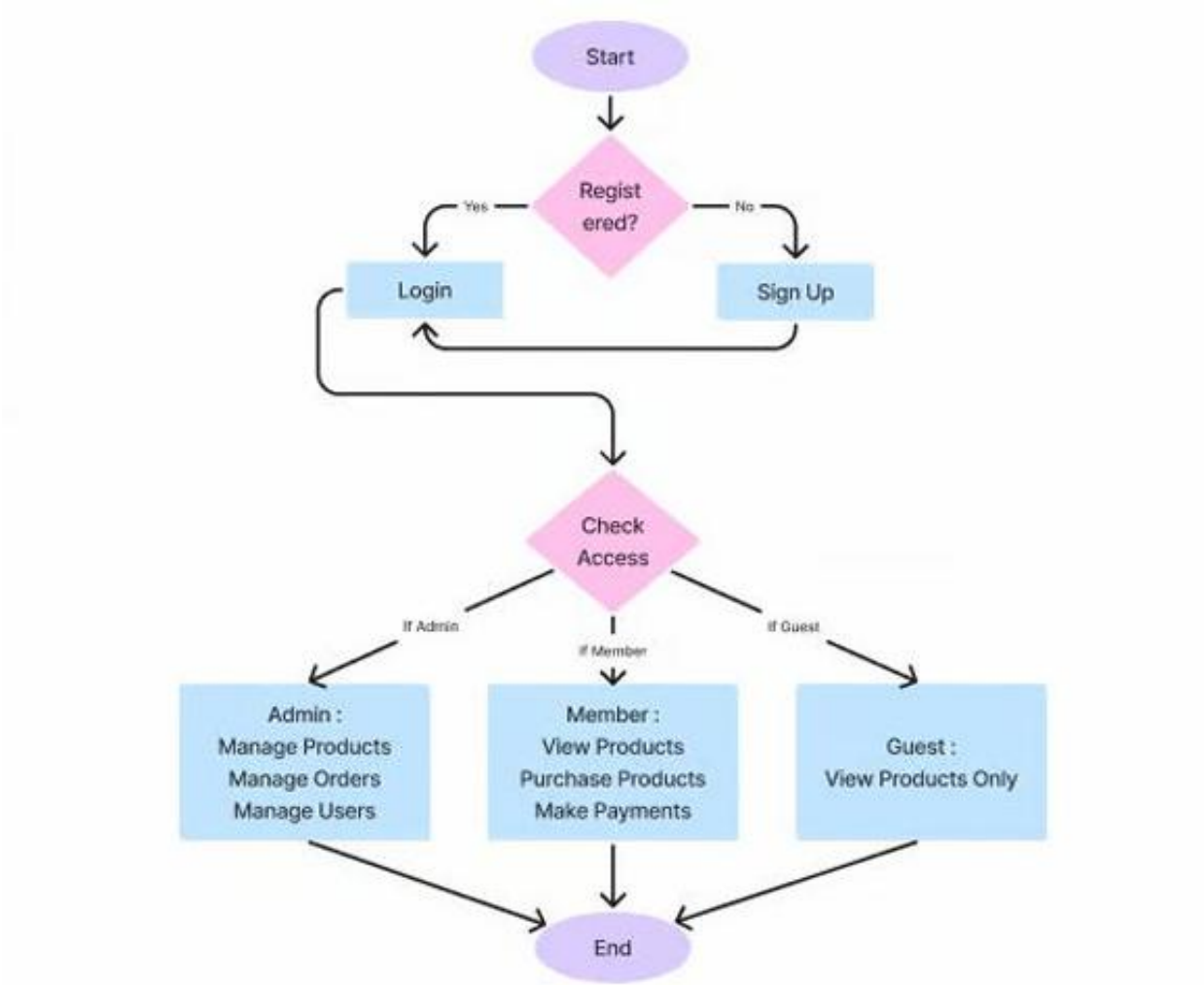


Figure 3.5 Flowchart

3.6 Database Design

Database design is one of the most important components of the proposed E-Commerce Management System. A well-structured database ensures efficient data storage, minimizes redundancy, and maintains data integrity. The system uses **MySQL** as the relational database management system because it is reliable, secure, and suitable for web-based applications.

The database stores all necessary information related to customers, administrators, products, categories, manufacturers, orders, payments, shipping details, and coupons. Each table is connected through primary and foreign keys to maintain proper relationships among the system modules. This design enables fast data retrieval and efficient transaction processing been systematically and critically analyzed on the grounds of evidence through this chapter.

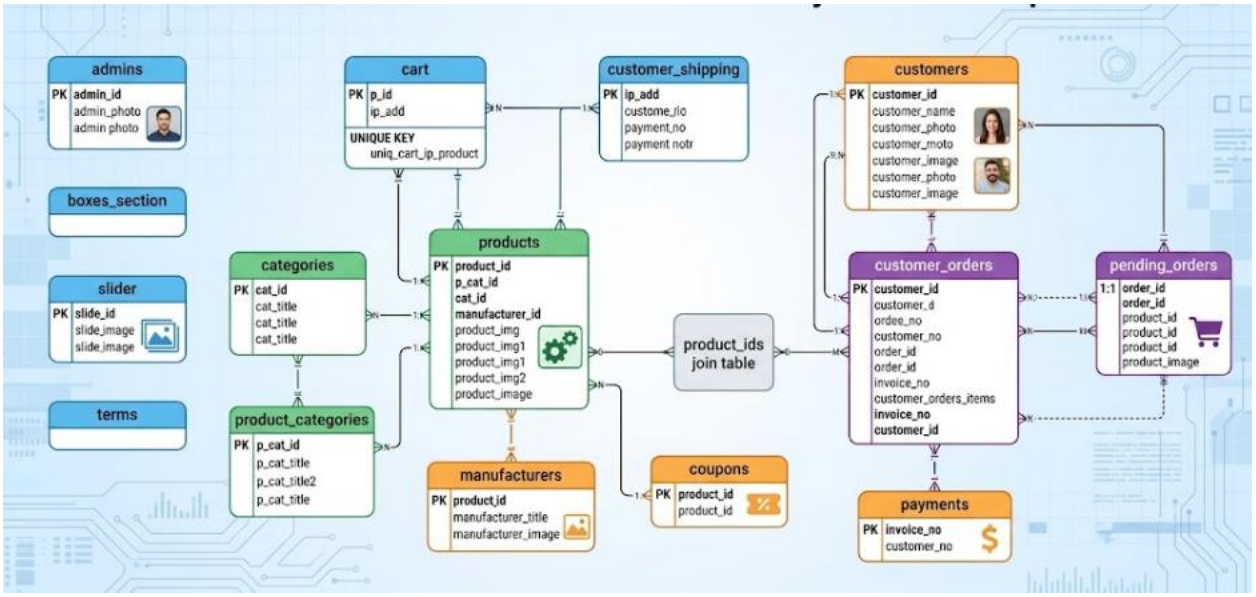


Figure 3.6 Database Structure

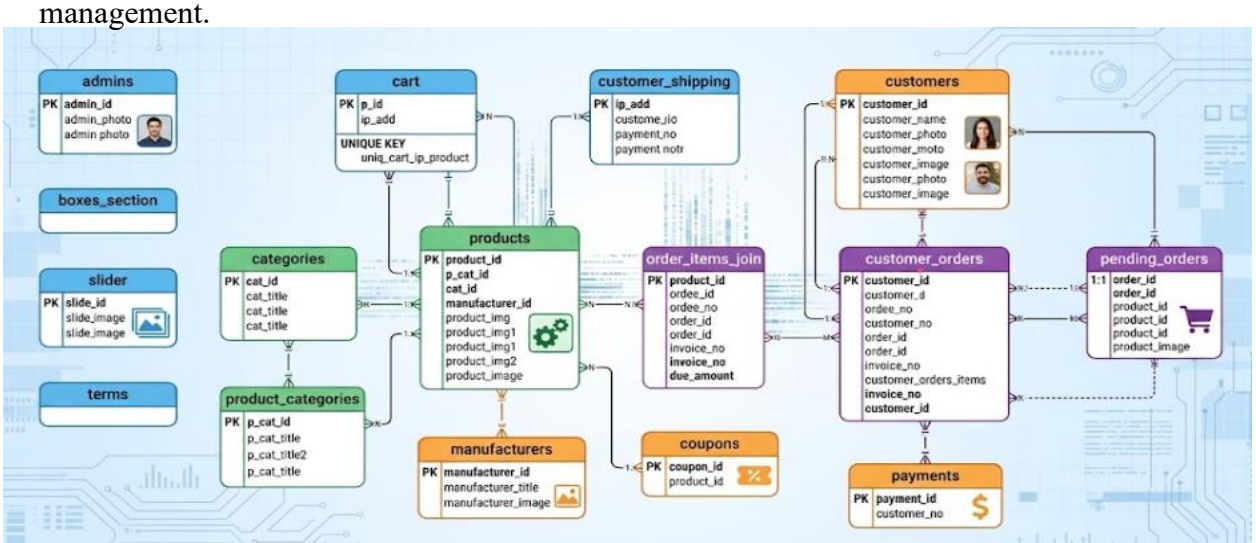
3.7 Entity Relationship (ER) Diagram

The Entity Relationship (ER) Diagram illustrates the relationship among the major entities used in the proposed system. It provides a clear understanding of how different tables interact with each other within the database

The main entities of the system include:

- ✓ **Administrator**
- ✓ **Customer**
- ✓ **Product**
- ✓ **Category**
- ✓ **Manufacturer**
- ✓ **Order**
- ✓ **Payment**
- ✓ **Shipping**
- ✓ **Coupon**

Each customer can place multiple orders, while each order contains one or more products. Products belong to specific categories and may also be associated with manufacturers. Payment and shipping information are linked to each order to ensure proper transaction management.



. Figure 3.7 Entity Relationship (ER) Diagram

3.8 User Interface Design

A user-friendly interface is essential for improving the usability of an e-commerce application. The proposed system has been designed with a clean and responsive interface that allows users to navigate easily across different pages

The customer interface includes:

- ✓ Home Page
- ✓ Product Page
- ✓ Product Details Page
- ✓ Shopping Cart
- ✓ Checkout Page
- ✓ Customer Login & Registration
- ✓ Order History

The administrator interface includes:

- ✓ Admin Login
- ✓ Dashboard
- ✓ Product Management
- ✓ Category Management
- ✓ Order Management
- ✓ Customer Management
- ✓ Payment Management

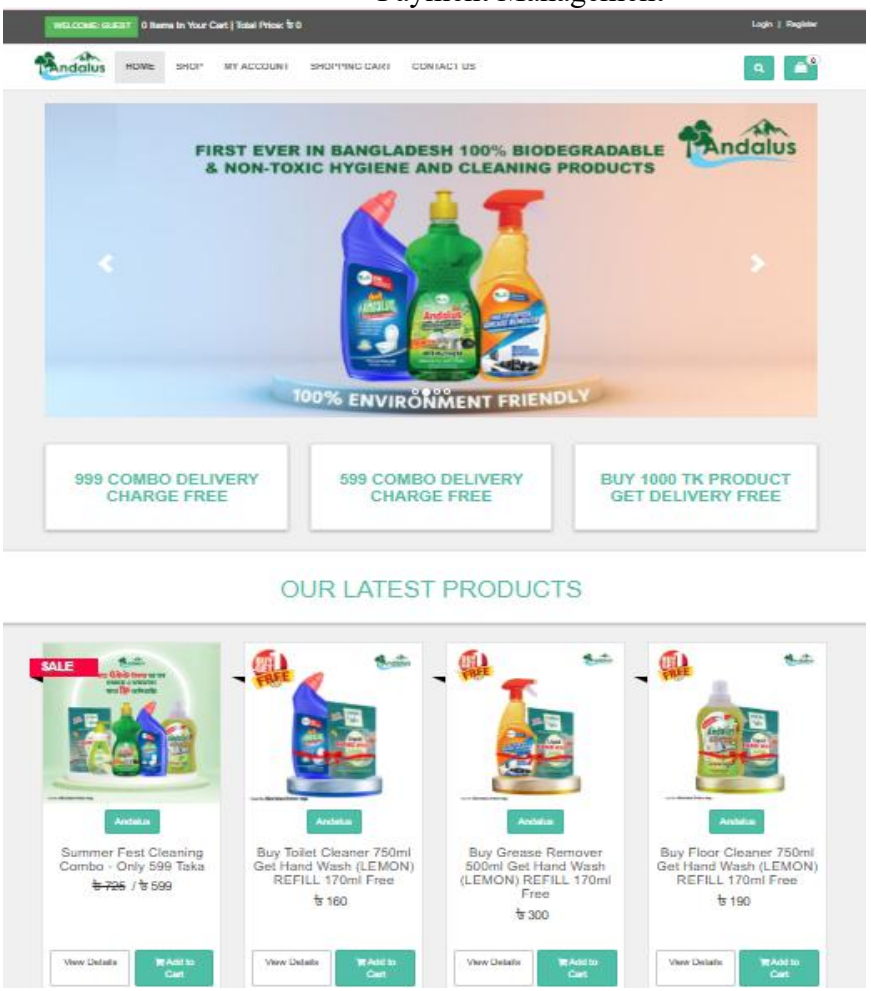


Figure 3.8 Home Page Design

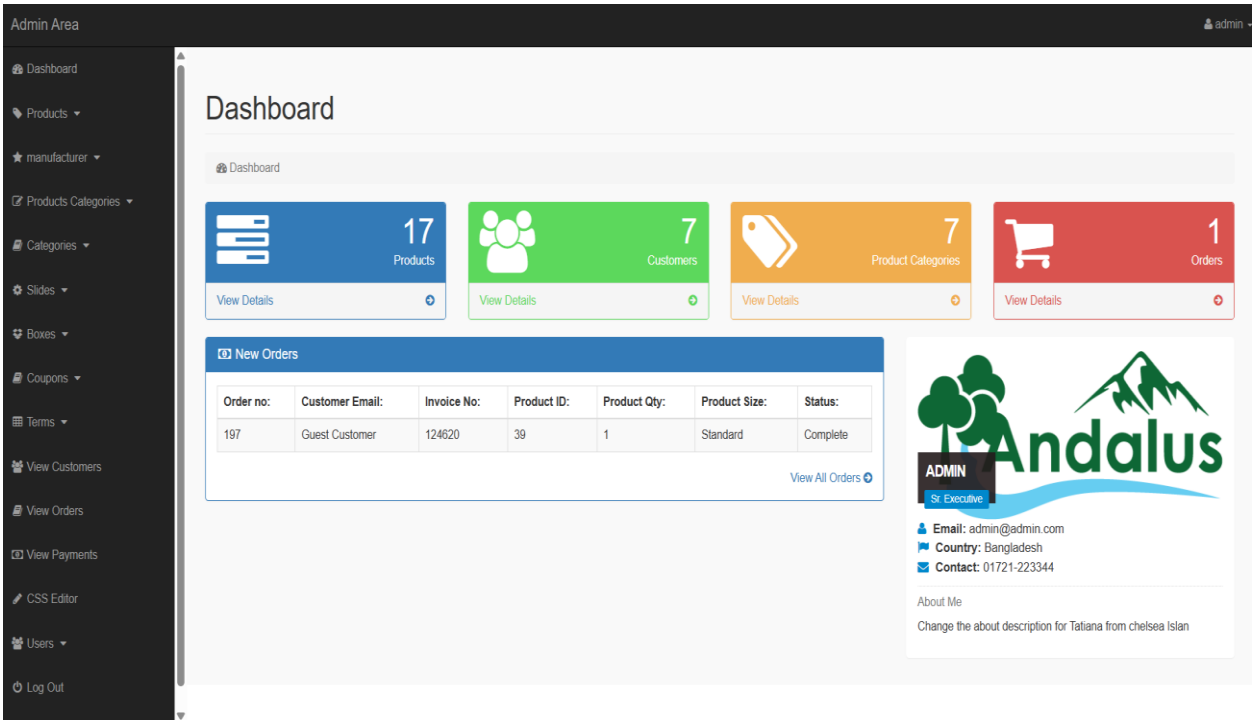


Figure 3.9 Admin Dashboard

CHAPTER 4
SYSTEM IMPLEMENTATION

4.1 Introduction

System implementation is the process of converting the system design into a functional web application. In this phase, all planned modules are developed, integrated, and tested to ensure that the system operates correctly. The proposed E-Commerce Management System has been implemented using modern web technologies including PHP, MySQL, HTML5, CSS3, Bootstrap, JavaScript, and AJAX.

The implementation focuses on developing a secure and user-friendly application where customers can browse products, place orders, and manage their accounts, while administrators can efficiently control products, customers, orders, payments, and other business activities. The application follows a modular structure, making it easier to maintain and extend in the future.

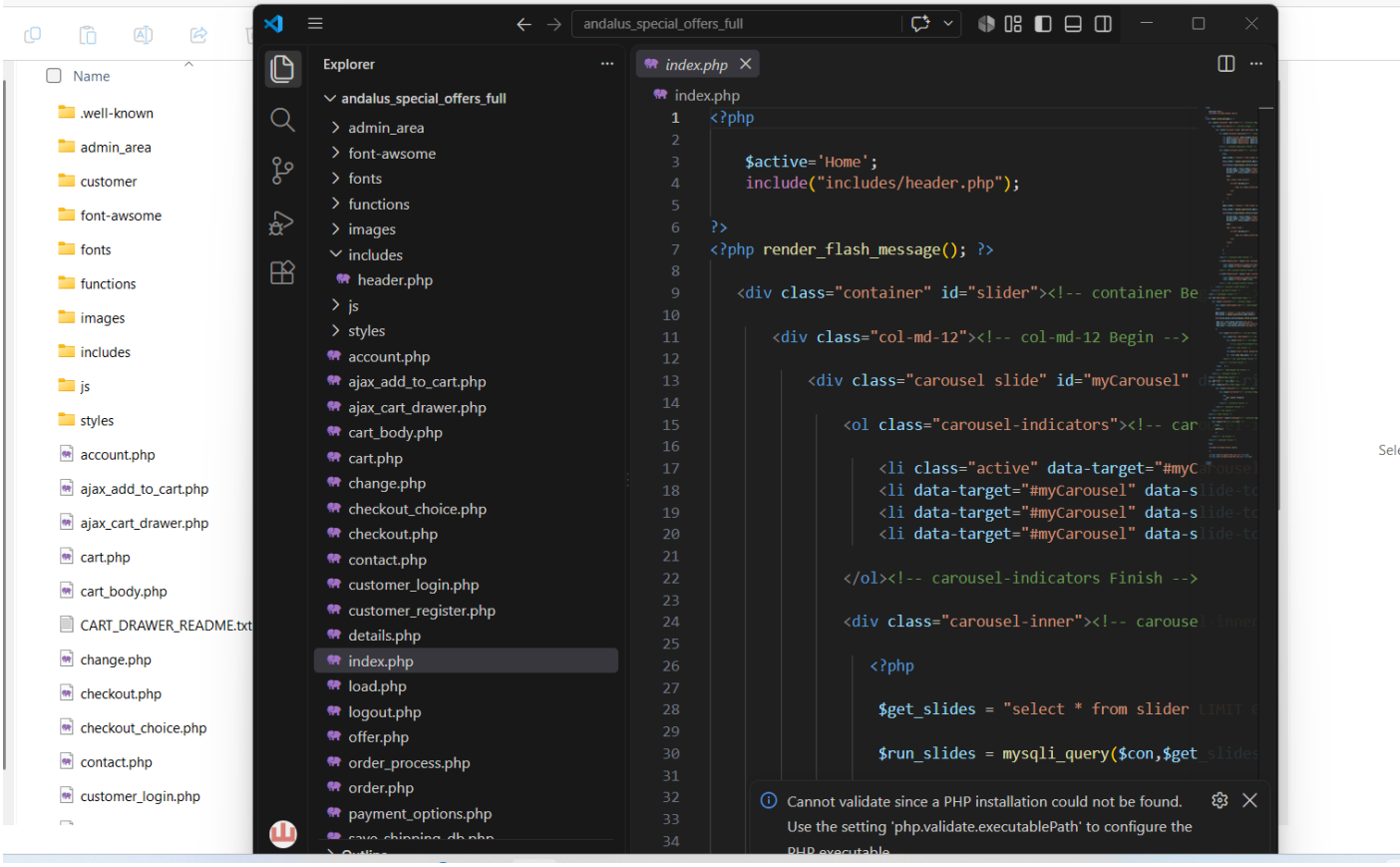


Figure 4.1 Development Environment

4.2 Development Tools and Technologies

The project has been developed using several software tools and programming technologies. These technologies ensure that the application is responsive, reliable, and easy to maintain..

Technology	Purpose
PHP	Server-side scripting
MySQL	Database management
HTML5	Web page structure
CSS3	User interface styling
Bootstrap	Responsive design
JavaScript	Client-side interaction
AJAX	Asynchronous data communication
XAMPP	Local server environment

Table 4.1 Development Technologies

4.3 Home Page Implementation

The Home Page is the first interface of the application. It displays featured products, product categories, navigation menus, search options, and promotional banners. Customers can easily browse products and navigate to different sections of the website.

The design has been kept simple and responsive so that users can access the website from desktops, laptops, or mobile devices without any difficulty

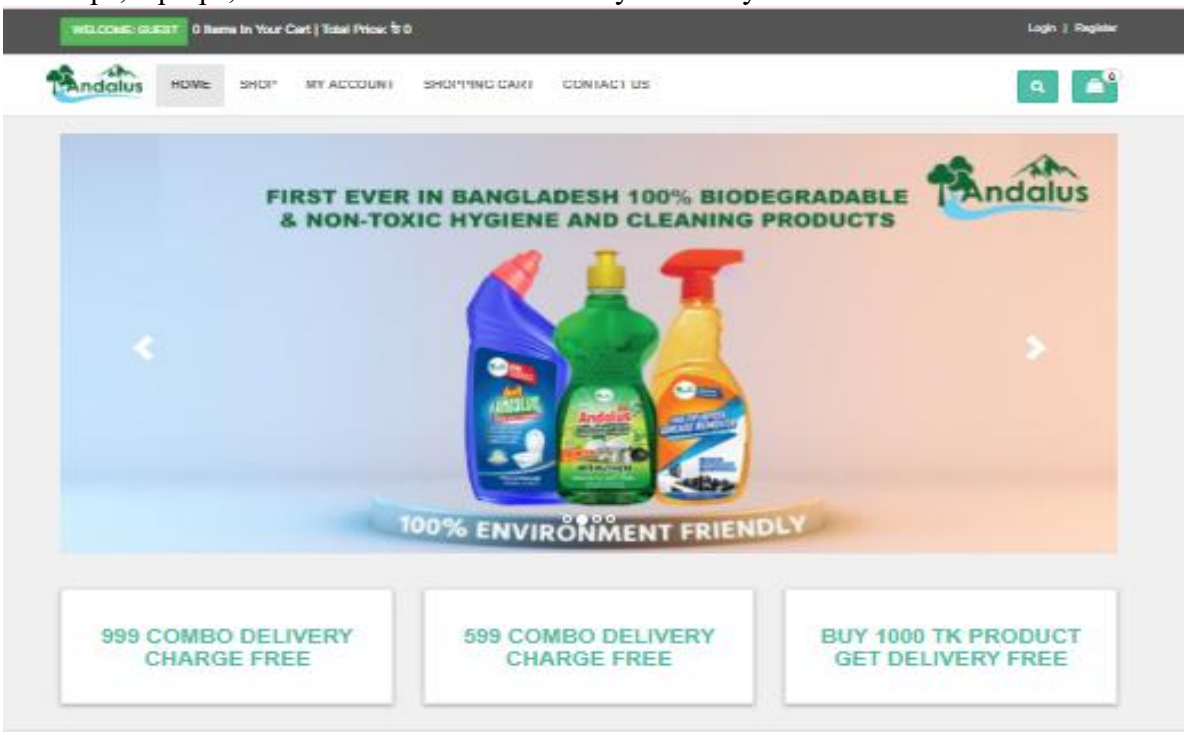


Figure 4.2 Home Page of the System

4.4 User Registration and Login Module

The system provides a secure registration and login mechanism for customers. New users can create an account by providing the required information, while existing users can log in using their email address and password.

After successful authentication, customers can access their profiles, shopping cart, and order history. This module ensures that only authorized users can perform account-related activities

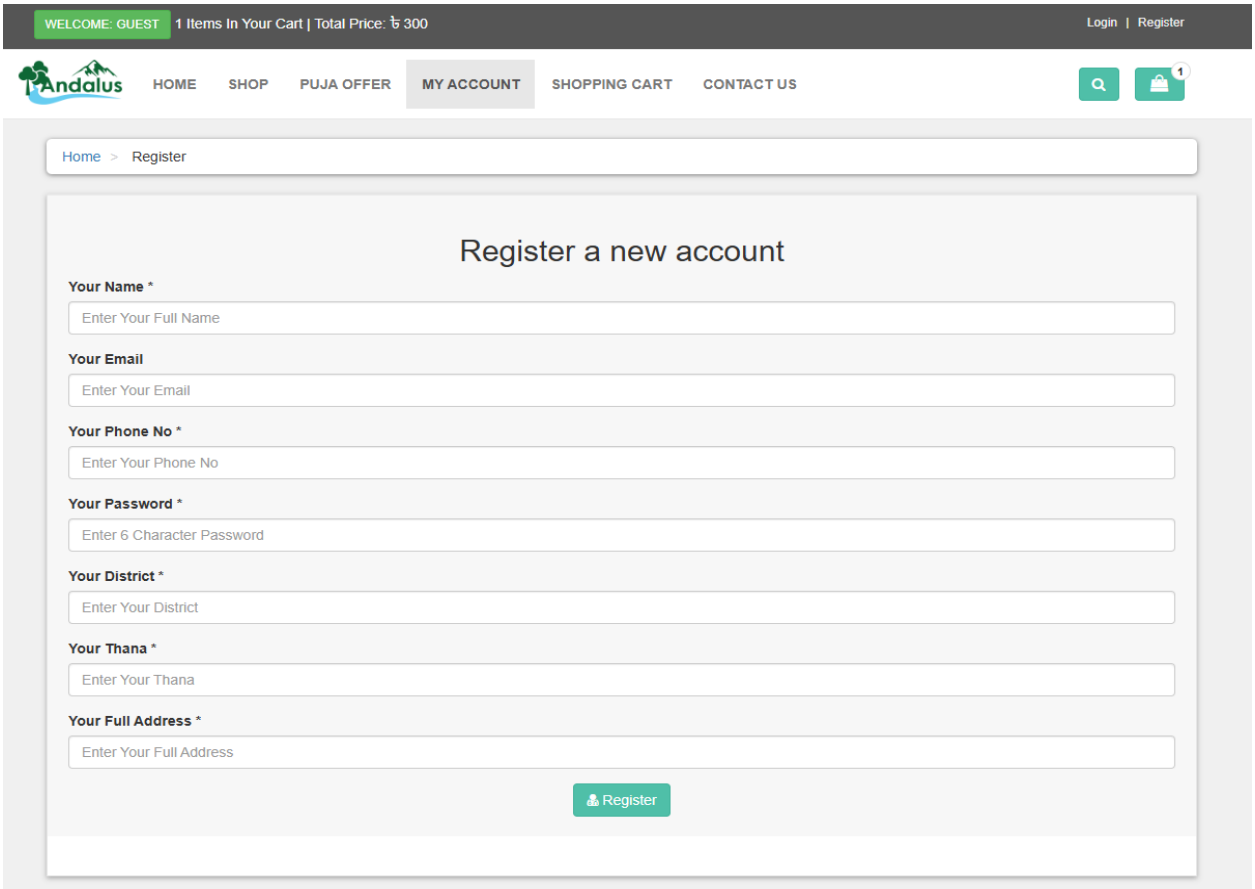


Figure 4.3 Customer Registration Page

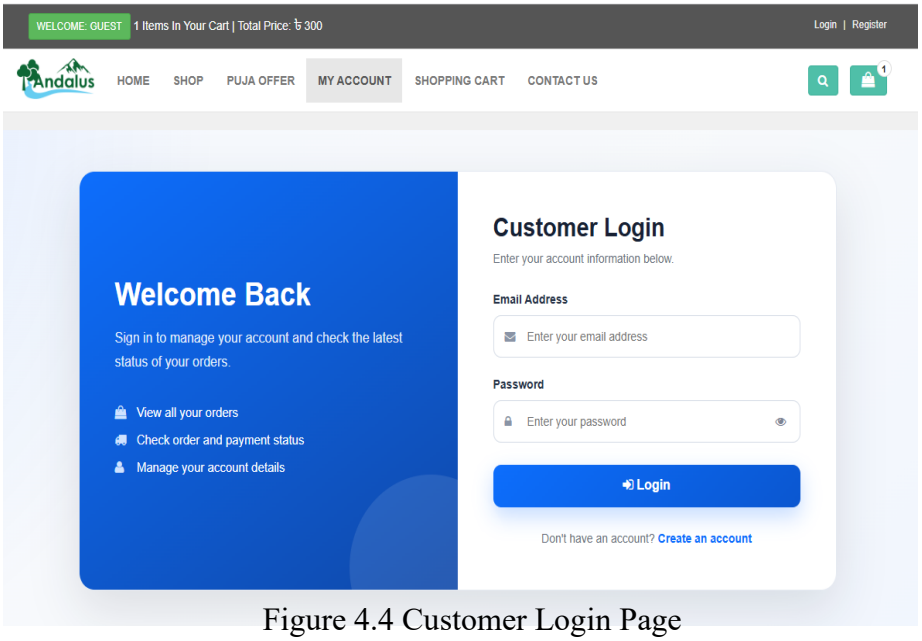


Figure 4.4 Customer Login Page

4.5 Product Management Page

The Product Management Module allows the administrator to manage all products available in the online store. Through the admin dashboard, products can be added, updated, deleted, or categorized based on business requirements

Each product includes details such as product name, category, price, description, stock quantity, and product image. This module ensures that customers always view updated product information

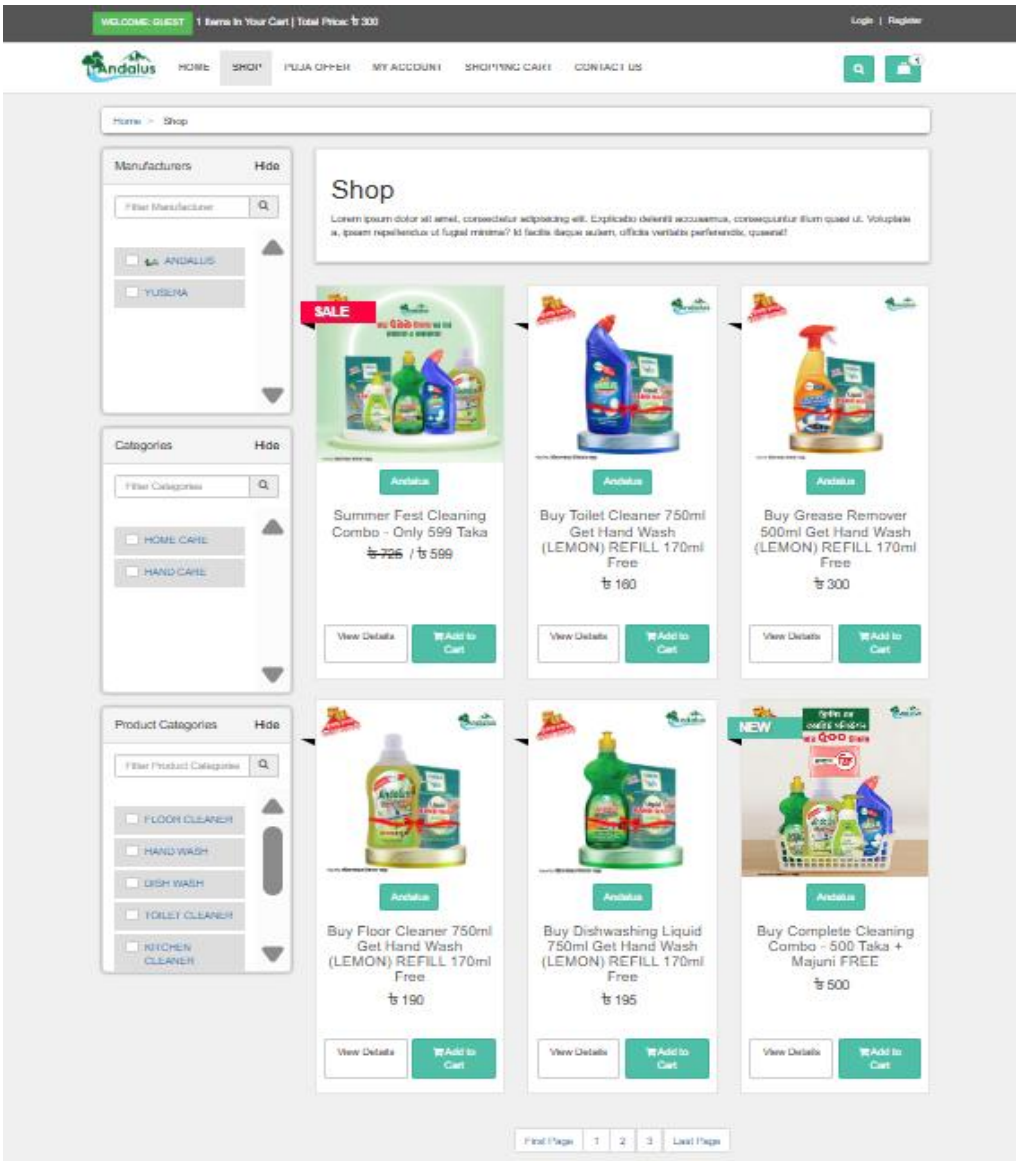


Figure 4.5 Product Management Page

4.6 Shopping Cart Module

The Shopping Cart Module is one of the core features of the proposed E-Commerce Management System. It allows customers to temporarily store selected products before completing the purchase. This module provides flexibility by enabling users to review, modify, or remove items from their cart at any time before checkout.

When a customer selects a product, the system stores the product information, quantity, and price in the shopping cart. The total amount is automatically calculated based on the selected quantity. Customers can increase or decrease product quantities, remove unwanted items, or continue shopping without losing previously selected products. This functionality improves the overall shopping experience by making the purchasing process more convenient and user-friendly.

The shopping cart also validates product availability before proceeding to checkout. If a product becomes unavailable or the requested quantity exceeds the available stock, the system notifies the customer immediately. This helps maintain accurate inventory records and prevents invalid orders.

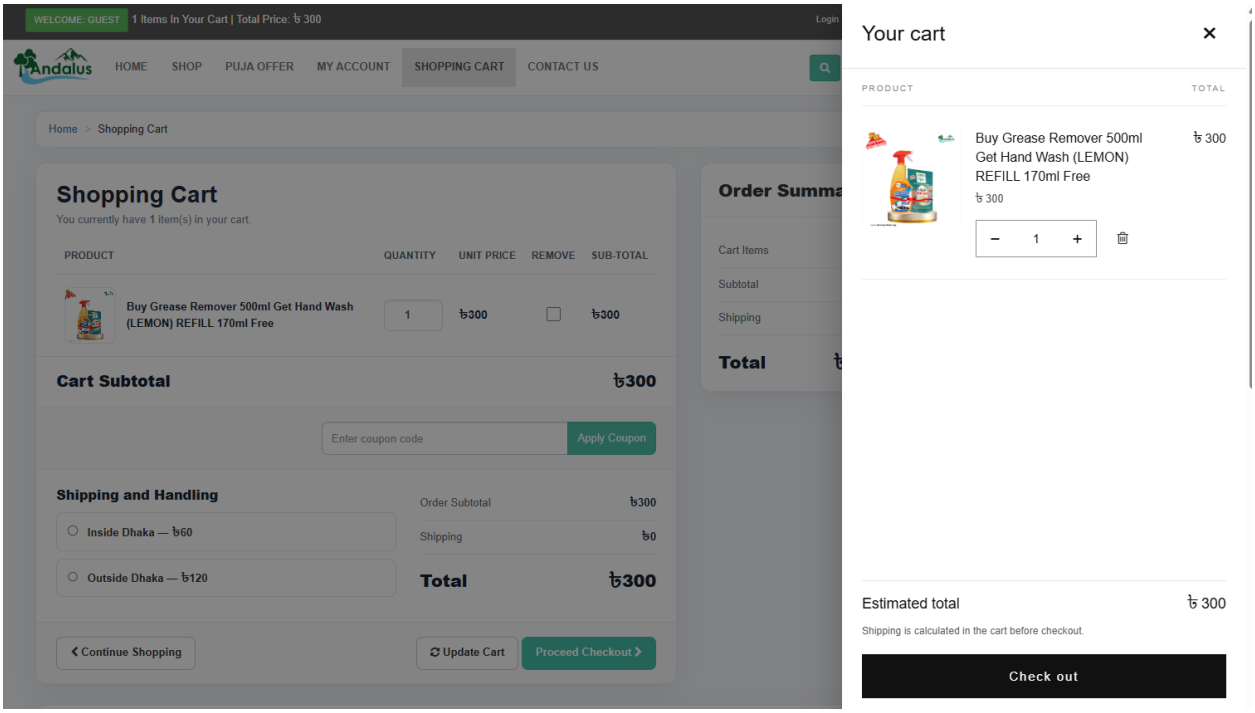


Figure 4.6 Shopping Cart Page

4.7 Checkout and Order Processing

The Checkout Module is responsible for completing the purchasing process. After reviewing the shopping cart, customers proceed to the checkout page, where they provide shipping information and confirm their order

Once the order is submitted, the system automatically generates an order record and stores all related information in the database. Each order receives a unique order identification number, allowing both customers and administrators to track its progress

The administrator can review incoming orders, update order status, and process deliveries through the admin dashboard. This automated workflow reduces manual effort and ensures accurate order management

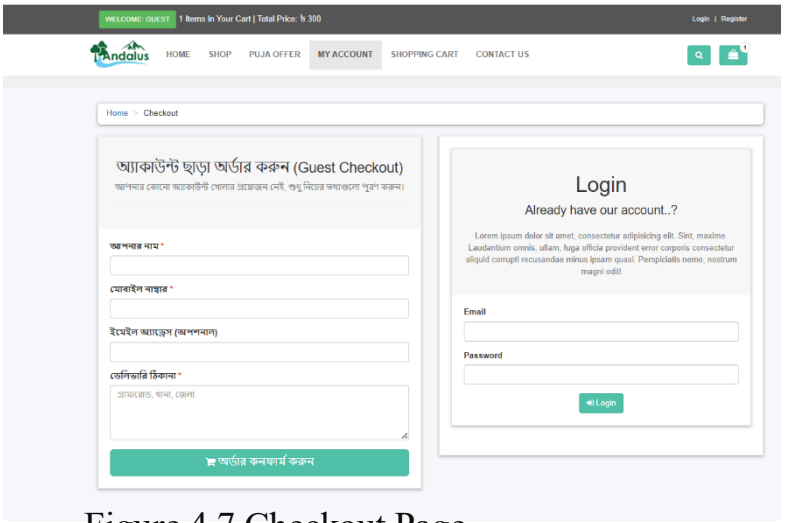


Figure 4.7 Checkout Page

4.8 Payment Management

The Payment Management Module records payment information associated with customer orders. Depending on the system configuration, customers can choose available payment methods during checkout. The system securely stores payment details and links them to the corresponding order.

Administrators can monitor payment status, verify completed transactions, and update payment records through the administration panel. This module improves financial record management and ensures transparency between customers and the business.

4.9 Administrative Dashboard

The Administrative Dashboard is the central control panel of the E-Commerce Management System. It enables administrators to manage all business operations through a single interface.

Using the dashboard, administrators can:

- ✓ Manage products and categories.
- ✓ Monitor customer accounts.
- ✓ Process customer orders.
- ✓ View payment information.
- ✓ Manage manufacturers and coupons.
- ✓ Update shipping information.
- ✓ Generate business reports.

The dashboard provides quick access to all major modules, allowing administrators to perform daily operations efficiently. It also displays business statistics that support decision-making and system monitoring.

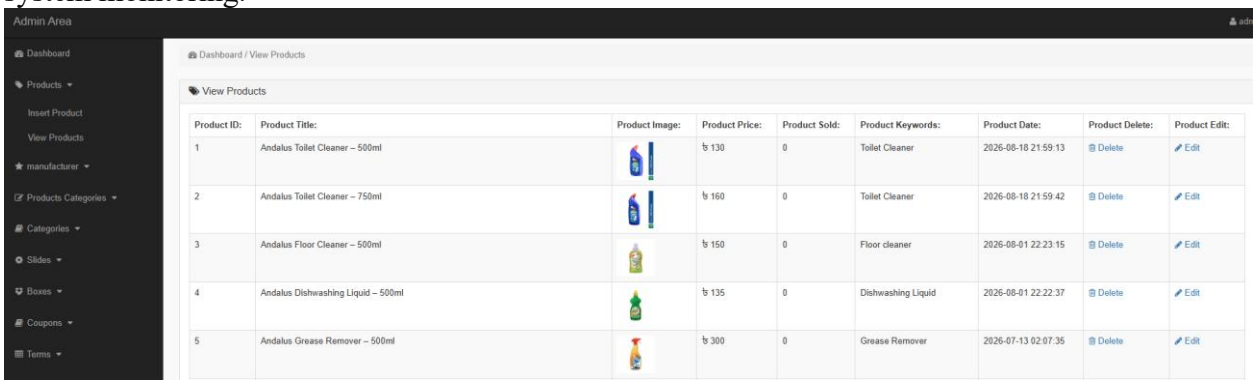


Figure 4.8 Product Management

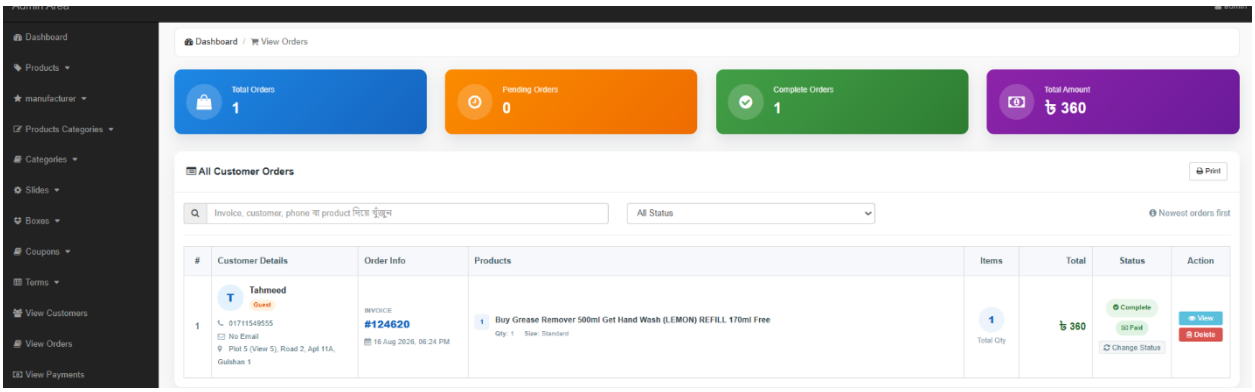


Figure 4.9 Order Management

CHAPTER 5
SYSTEM TESTING AND RESULTS

5.1 Introduction

System testing is an essential phase of software development that ensures all modules of the application function correctly according to the specified requirements. The main objective of testing is to identify and eliminate errors before the system is deployed for practical use. It also verifies the reliability, functionality, security, and usability of the proposed E-Commerce Management System.

The developed system was tested by executing different user activities such as registration, login, product browsing, shopping cart operations, order placement, and administrative management. The testing process confirmed that all modules performed successfully and interacted correctly with the database

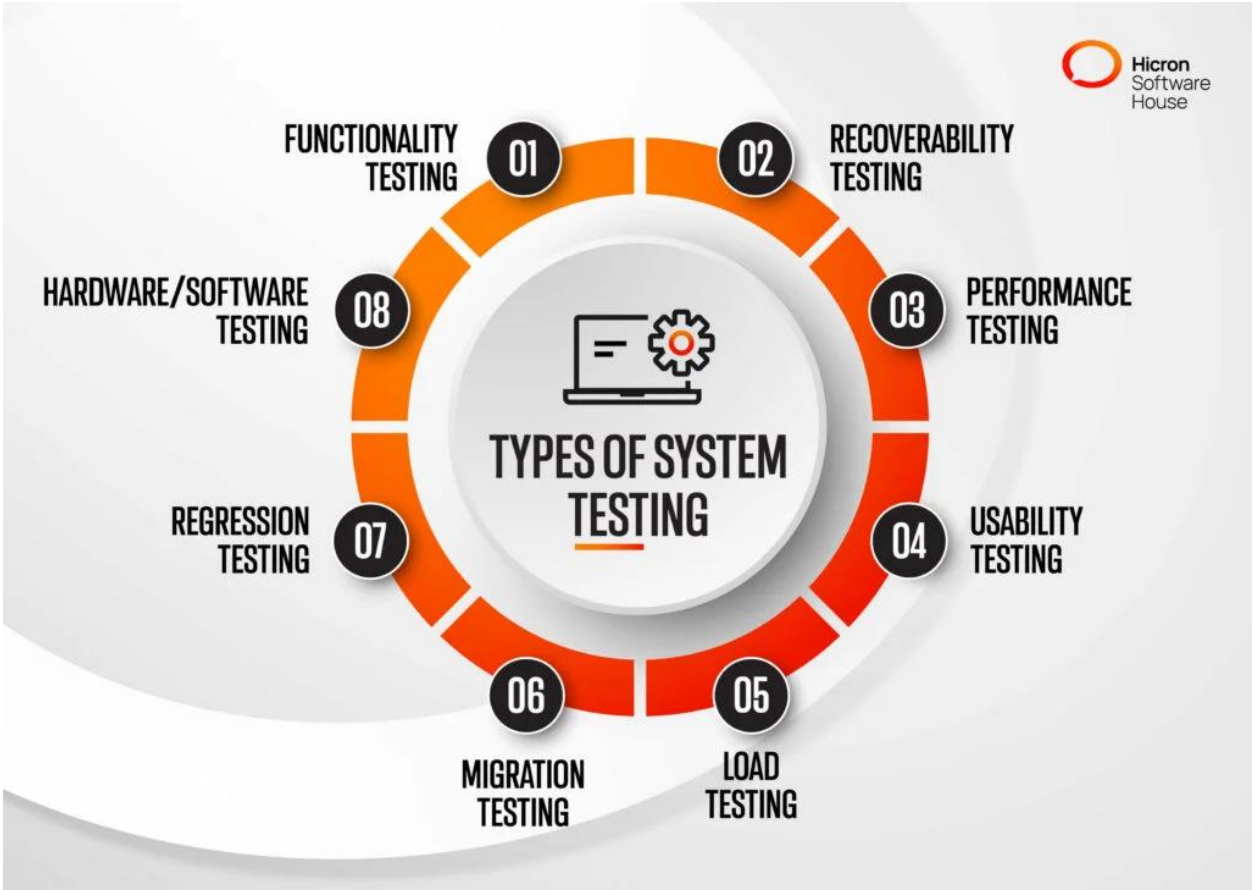


Figure 5.1 Testing Process

5.2 Functional Testing

Functional testing was carried out to verify whether each feature of the application performed according to the system requirements. Both customer and administrator modules were tested individually to ensure smooth operation.

The following major functions were tested:

- ✓ Customer Registration
- ✓ Customer Login
- ✓ Product Search
- ✓ Shopping Cart
- ✓ Checkout Process
- ✓ Order Management
- ✓ Product Management
- ✓ Admin Login

The test results confirmed that all modules operated correctly without major functional errors.

Function	Expected Result	Status
User Registration	New account created successfully	Passed
User Login	User logged into the system	Passed
Product Search	Products displayed correctly	Passed
Add to Cart	Product added successfully	Passed
Order Placement	Order stored in database	Passed
Admin Login	Dashboard displayed successfully	Passed

Table 5.1 Functional Test Results

5.3 System Performance

The performance of the proposed system was evaluated based on speed, usability, and reliability. During testing, web pages loaded quickly and all user requests were processed without noticeable delays. Database operations such as product retrieval, order processing, and customer management were completed efficiently.

The application also maintained stable performance while handling multiple operations such as product browsing, shopping cart updates, and order confirmation. The responsive user interface provided a smooth experience on different screen sizes and modern web browsers

5.4 Result Analysis

The testing results indicate that the proposed E-Commerce Management System successfully fulfills the project objectives. Customers can easily browse products, manage their shopping carts, place orders, and track their purchase history. Similarly, administrators can efficiently manage products, customers, orders, and payments through the administrative dashboard.

The integration of PHP and MySQL ensures reliable communication between the application and the database, resulting in accurate data storage and retrieval. Overall, the developed system provides a secure, efficient, and user-friendly solution for online business management.

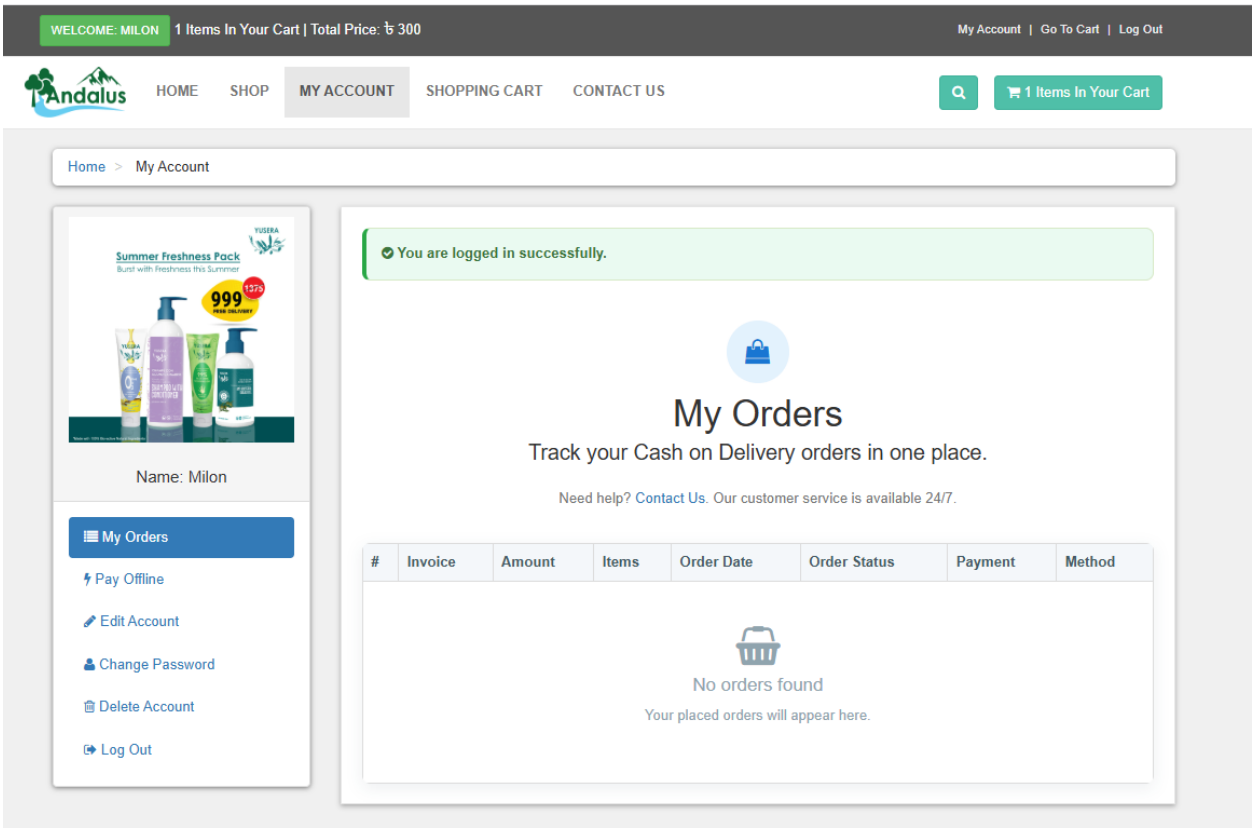


Figure 5.2 Customer Home Page After Login

5.5 Advantages of the Proposed System

The developed system offers several advantages over traditional business management methods:

- ✓ Provides a secure online shopping environment.
- ✓ Reduces manual paperwork and human errors.
- ✓ Improves inventory and order management.
- ✓ Saves time for both customers and administrators.
- ✓ Offers a responsive and user-friendly interface.
- ✓ Supports future expansion with additional features.

CHAPTER 6
SYSTEM EVALUATION AND DISCUSSION

6.1 Introduction

System evaluation is an important stage of software development that measures the overall effectiveness, reliability, and usability of the developed application. It helps determine whether the system has successfully achieved its objectives and satisfies user requirements. For the proposed E-Commerce Management System, the evaluation focuses on system performance, usability, security, and practical applicability.

The developed application was evaluated through different functional operations, including customer registration, product browsing, shopping cart management, order processing, and administrative activities. The evaluation results indicate that the system performs efficiently and provides a reliable platform for managing online business operations.

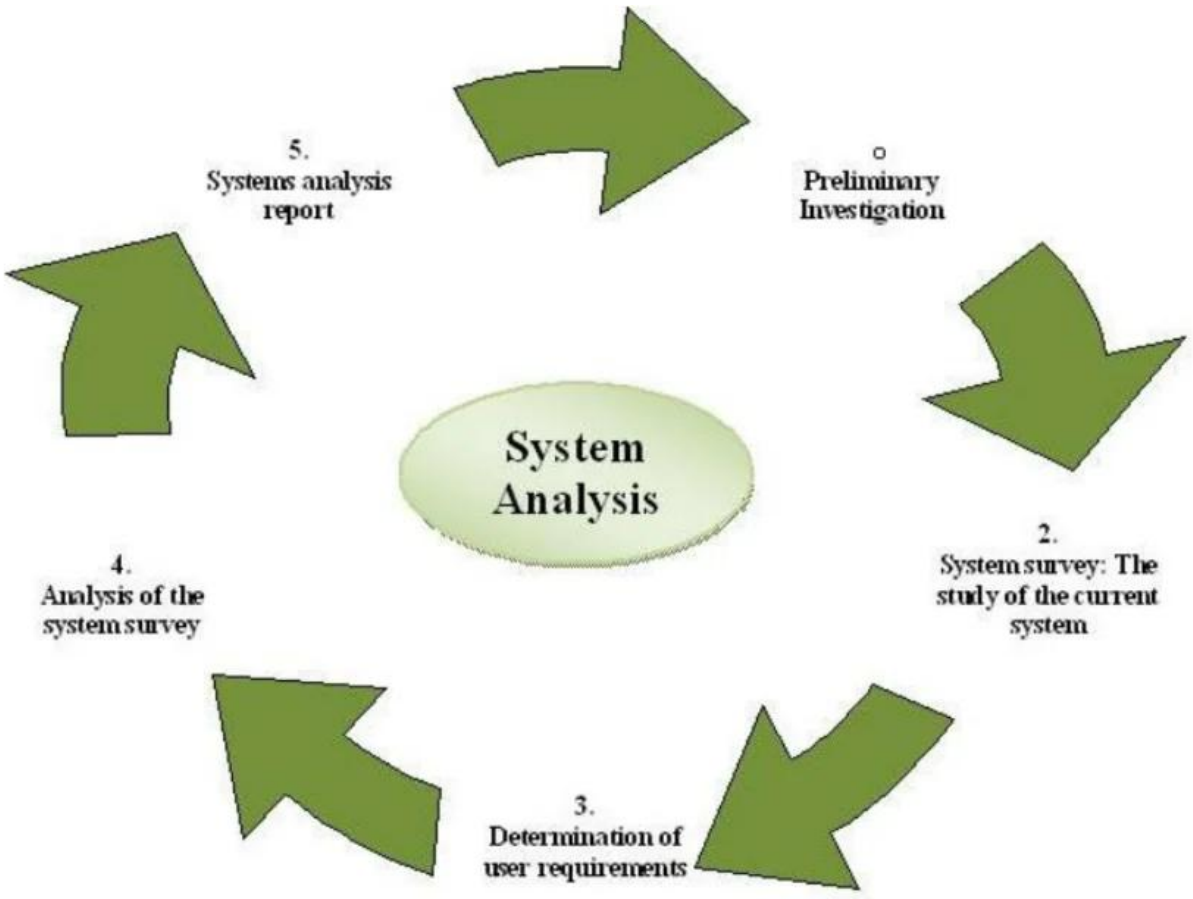


Figure 6.1 Overall Evaluation Process

6.2 System Performance Evaluation

The performance of the proposed system was evaluated based on its ability to execute different operations accurately and efficiently. During testing, the application successfully handled user registration, authentication, product management, order processing, and customer management without any major errors.

The response time of the system remained satisfactory under normal operating conditions. Product information was retrieved quickly from the database, and customer requests were processed efficiently. The modular design and optimized database structure also contributed to improving the overall performance of the application.

The evaluation confirms that the system provides a smooth and reliable user experience for both customers and administrators.

6.3 Security Evaluation

Security is one of the most important aspects of any web-based application. The proposed system includes several security mechanisms to protect user information and maintain data integrity.

User authentication ensures that only registered users can access customer accounts, while the administrator panel is protected through separate login credentials. The system validates user inputs before storing data in the database, reducing the possibility of invalid data entry.

In addition, the database maintains separate records for customers, products, and orders, ensuring secure and organized information management. These security features improve the overall reliability of the proposed system.

6.4 Discussion

The developed E-Commerce Management System successfully fulfills the primary objectives defined at the beginning of this project. It provides an integrated platform where customers can easily browse products, place orders, and manage their accounts, while administrators can efficiently control business operations from a centralized dashboard.

Compared with manual business management, the proposed system significantly reduces paperwork, improves data accuracy, and speeds up order processing. The responsive user interface and structured database design also contribute to better usability and system maintenance.

Although the system meets the essential requirements of an online shopping platform, several advanced features can be incorporated in future versions to further improve its functionality and user experience.

6.5 Real -Time Detection

Advantages:

The proposed system offers several benefits for both customers and business owners:

- ✓ Provides a simple and user-friendly interface.
- ✓ Reduces manual work and operational errors.
- ✓ Improves product and order management.
- ✓ Maintains centralized business information.
- ✓ Supports efficient customer management.
- ✓ Provides secure user authentication.
- ✓ Easy to maintain and upgrade

Limitations:

Despite its successful implementation, the current version has some limitations:

- ✓ Online payment gateway integration is not available.
- ✓ Email and SMS notifications are not implemented.
- ✓ Mobile application support is unavailable.
- ✓ Sales analytics and graphical reports are limited.
- ✓ AI-based product recommendation is not included.

CHAPTER 7
CONCLUSION, LIMITATIONS AND FUTURE WORK

7.1 Overall Project Achievement

The proposed E-Commerce Management System has been successfully designed, developed, and evaluated to provide a complete web-based platform for managing online business activities. Throughout this project, different phases of the Software Development Life Cycle (SDLC), including requirement analysis, system design, implementation, testing, and evaluation, were completed successfully.

The developed application enables customers to register, browse products, add items to the shopping cart, place orders, and monitor their purchase history through an easy-to-use interface. At the same time, administrators can efficiently manage products, categories, customers, orders, payments, and other business information using a centralized administrative dashboard.

The successful implementation of the system demonstrates the practical application of PHP, MySQL, HTML5, CSS3, Bootstrap, and JavaScript in developing a reliable and responsive e-commerce platform. The testing results indicate that the system performs efficiently under normal operating conditions and satisfies the primary objectives of the project.

7.2 Practical Benefits

The proposed system offers several practical benefits for both customers and business organizations. It simplifies traditional business operations by replacing manual processes with an automated web-based solution. Customers can purchase products anytime and from any location without physically visiting a store, while administrators can monitor business activities through a single management dashboard.

The major practical benefits include:

- Easy online product browsing and purchasing.
- Faster order processing and customer service.
- Efficient product and inventory management.
- Centralized storage of business information.
- Reduced paperwork and operational costs.
- Improved customer satisfaction through a simple and responsive interface.
- Better business management with organized sales and order records.

The developed system can be effectively used by small and medium-sized businesses that wish to establish or improve their online business operations.

7.3 Limitations

Although the proposed system successfully achieves its primary objectives, some limitations still exist that can be improved in future versions.

1. **Limited Payment Options**

The current system mainly supports manual payment management. Popular online payment gateways such as SSLCommerz, bKash, Nagad, and Rocket have not yet been integrated.

2. **No Mobile Application**

The application is currently web-based only. A dedicated Android or iOS application is not available, which may reduce convenience for mobile users.

3. **Limited Security Features**

Basic authentication mechanisms have been implemented; however, advanced security features such as Two-Factor Authentication (2FA), CAPTCHA verification, and encrypted password recovery can further improve system security.

4. **Limited Business Analytics**

The system provides basic management functionality but does not include advanced sales analysis, graphical reports, or business intelligence dashboards for decision-making.

5. **Customer Review and Rating System**

Customers cannot currently submit product reviews or ratings. Such a feature would improve customer engagement and help future buyers make informed purchasing decisions.

6. **No Real-Time Notification Service**

The application does not send automatic email or SMS notifications after order confirmation, payment updates, or shipping status changes.

7.4 Future Works

The proposed system can be further enhanced by implementing several advanced features to improve usability, security, and overall business performance.

1. **Online Payment Gateway Integration**

Future versions should integrate secure online payment systems such as SSLCommerz, bKash, Nagad, Rocket, and international payment gateways to provide faster and safer transactions.

2. **Mobile Application Development**

Developing dedicated Android and iOS applications would allow customers to shop more conveniently using smartphones and tablets.

3. **AI-Based Product Recommendation**

Artificial Intelligence and Machine Learning techniques can be incorporated to recommend products based on customer preferences, purchase history, and browsing behavior.

4. **Advanced Sales Analytics**

Interactive dashboards with charts, sales trends, monthly reports, and customer insights can help business owners make better strategic decisions.

5. **Live Chat and Customer Support**

A real-time customer support system can improve communication between customers and administrators and increase customer satisfaction.

6. **Multi- Vendor Marketplace**

The application can be expanded into a multi-vendor platform where multiple sellers can register, upload products, and manage their individual online stores

7. **Cloud Deployment and Enhanced Security**

Future deployment on cloud platforms with automated backup, data encryption, SSL certificates, and Two-Factor Authentication will improve system reliability and security

7.5 Final Conclusion

The E-Commerce Management System developed in this project successfully demonstrates how modern web technologies can be utilized to create an efficient, reliable, and user-friendly online shopping platform. The application meets the essential requirements of customers and administrators by providing integrated modules for product management, customer management, shopping cart operations, order processing, and administrative control.

This project has significantly enhanced our practical knowledge of software engineering, database management, web development, and system implementation. It also demonstrates the effective application of theoretical concepts learned during the Bachelor of Science in Computer Science and Engineering program.

With the addition of advanced technologies such as online payment integration, mobile applications, AI-based recommendations, and cloud computing, the proposed system has the potential to evolve into a complete commercial e-commerce solution capable of serving modern digital businesses efficiently.

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