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E-Shop

Harshal Dharbale[1], Sudarshan Gaikwad[2], Aryan Magar[3], Rushikesh Mane[4], Prof. Vaishali Gavli[5]
Department of Computer Engineering[1,2,3,4,5]
Matoshri Aasarabai Polytechnic, Eklahare, Nashik, Maharashtra, India

Abstract: *The E-Shop system provides a robust e-commerce platform enabling customers to browse, filter, and purchase products online. Users can easily manage their selections and proceed through the checkout process, with email notifications sent for user registrations, order confirmations, shipping updates, and restock alerts for out-of-stock items. Admins can efficiently manage the product inventory, update listings, and monitor order statuses (shipped or delivered). The system streamlines product management, enhances order tracking, and reduces manual efforts, contributing to improved operational efficiency and an enhanced user experience.*

Keywords: E-Commerce, Online Shopping, Product Management, Order Tracking, Admin Panel, Email Notifications, User Registration

I. INTRODUCTION

Definition

The E-Shop system is a web-based platform designed to streamline online shopping and order management for both customers and administrators. It allows users to browse and purchase products, modify cart quantities, and easily complete the checkout process. Administrators can efficiently manage product inventories, track orders, and update product information. The system also sends automated email notifications for actions such as user registration, order confirmation, shipment tracking, and product restocking. By automating key e-commerce functions, the E-Shop system enhances operational efficiency, improves the user experience, and simplifies business operations.

Goal:

The primary goal of developing the E-Shop System is to create a user-friendly and efficient platform for both customers and store administrators. The system is designed to automate product management, streamline order processing, and reduce manual intervention. By integrating features such as email notifications, the system enhances customer satisfaction by keeping users informed about their orders and product availability. Ultimately, the goal is to provide a seamless online shopping experience while simplifying backend management for store owners.

Scope:

This project is developed as a scalable web application, designed to cater to e-commerce businesses of all sizes. It offers easy product browsing, efficient order management, and real-time customer interaction through automated email notifications. While the current system is a demo simulating the payment process, it can be extended to integrate with actual payment gateways and customized for various business needs. With features like inventory management, order tracking, and personalized notifications, the system is flexible and ready for future enhancements, making it an ideal solution for modern e-commerce.

II. OVERALL DESCRIPTION

Product Perspective:

The E-Shop System is a stand-alone web application designed to provide a seamless online shopping experience for customers while allowing store administrators to effectively manage inventory, orders, and customer interactions. This system automates core e- commerce tasks such as product listing, order processing, and customer notifications, improving the shopping experience for both users and administrators. It ensures smooth, efficient operations for any e-commerce business, offering flexibility and scalability to accommodate diverse product categories and customer

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requirements. The system serves as a centralized platform that simplifies order management, reduces manual intervention, and enhances overall user satisfaction.

Product Features:

The E-Shop System has two distinct user roles:

Admin:

Admins have full access to the back-end of the system. They can manage product listings (add, update, delete products), track orders, monitor inventory levels, and update the status of orders (e.g., shipped, delivered). Admins are also responsible for managing user accounts and handling customer notifications. They can monitor the overall performance of the store and ensure smooth operations.

User:

There are two types of users in the system:

- **Customer:** Customers can register, log in, browse the product catalog, filter products, add items to their shopping cart, modify quantities, and proceed to checkout. They can also view their order history and receive email notifications about order status, product availability, and shipping updates.
- **Guest:** A guest user can browse products and add items to the cart, but they must register or log in to complete the checkout process and place an order.

III. SYSTEM ANALYSIS

System analysis involves examining the system's components, design, and functionality to optimize its performance and meet user needs. For the E-Shop System, the focus is on defining requirements, designing the system, and ensuring efficient operations.

Key Tasks of System Analysis:

Understanding the Java Application:

The system will be developed using Java, JDBC, Servlets, and JSP to ensure a robust backend for handling user interactions and order processing.

Defining the Overall Plan:

Designing a platform that supports customers and admins with features like product browsing, cart management, order processing, and inventory management.

Scheduling According to Plan:

The development will be divided into stages: Design, Development, Testing, and Deployment.

Analyzing Developed Solutions:

Post-development, the system's structure, security, and scalability will be evaluated to ensure proper integration

Market Survey:

A survey will gather feedback from users to guide improvements in UI/UX and system features.

Cost-Benefit Analysis:

A financial feasibility analysis will compare development costs with the benefits of improved operations and customer satisfaction.

The E-Shop System aims to automate key e-commerce tasks, reduce manual work, and enhance the efficiency of online shopping for both customers and administrators.

IV. REQUIREMENT SPECIFICATIONS

Hardware Requirements:

- **Memory**: 4 GB (Minimum), 8 GB (Recommended)
- **Hard Disk**: 500 GB or higher
- **Processor**: Intel Core i3, i5, or equivalent
- **Additional**: Internet connection for email functionality and database synchronization

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Software Requirements:

- **Operating System**: Windows 10/11
- **Front-End Development**: HTML, CSS, JavaScript, Bootstrap, and jQuery
- **Back-End Development**: Java (JDK 8+), JDBC, Servlets, JSP
- **Database**: MySQL (using MySQL Workbench or phpMyAdmin)
- **Server**: Apache Tomcat v8.0+ for running the web application
- **IDE**: Eclipse EE (Enterprise Edition), or IntelliJ IDEA for Java development
- **Build Tools**: Apache Maven for dependency management and building the project

Features Requirements: The E-Shop System offers a range of features to make online shopping easy for customers and manageable for admins. Customers can register, log in, and enjoy a personalized shopping experience. They can browse products by category, filter items based on different attributes, and search for specific products. The system also allows users to add products to their shopping cart, change quantities, or remove items. When ready, customers can go through the checkout process, enter dummy payment details, and complete their orders.

For administrators, there's a special dashboard that allows them to manage product listings, track orders, update inventory, and review sales reports. Additionally, automated email notifications keep customers informed about their registration, order status, and shipping updates.

Reliability: The system's reliability is essential for smooth operation. If the server or database faces any issues, the system will temporarily stop processing orders. However, once the issue is fixed, it will resume its normal operations with minimal data loss. There will also be backup systems in place to recover data if anything unexpected happens

Availability: The system is available to authorized users only. Customers can browse and place orders after registering and logging in, while administrators have exclusive access to the admin panel to manage products and monitor orders. To keep the system always accessible, regular server maintenance and monitoring are carried out to ensure everything works smoothly.

Portability: Since the E-Shop System is web-based, it can be accessed on any device with a modern web browser, such as Chrome, Firefox, or Safari. It works across different operating systems like Windows, MacOS, and Linux, as long as the necessary software (Java, MySQL, and Apache Tomcat) is installed. This ensures the system is flexible and can run on different platforms.

V. DESIGN

Input Design:

Input design is an important part of how users interact with the system. For the E-Shop System, the focus is on making sure the process is easy and error-free. The system collects various types of input, like user registration details, product searches, and payment information.

- **User Registration:** Users will enter their name, email, and password in a simple form. The system will check if the email format is correct and if the password is strong enough.
- **Product Search & Cart Management:** Users can search for products by entering keywords, selecting categories, and adjusting quantities in the cart. This data is captured through search fields, dropdown menus, and input boxes.
- **Order and Payment Information:** When users are ready to purchase, they'll enter their shipping address, review their cart, and enter dummy payment details. This information is securely captured and used to process the order.

All input forms are designed with validation to reduce errors. JavaScript is used to check the data before submission, and server-side validation ensures everything is secure and accurate.

Output Design:

Output design is about how the system shows results to users after processing their inputs. For the E-Shop System, the output includes confirmation messages, order summaries, and product listings.

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User Interface (UI): The system's design is simple and easy to use. Users can view product details, manage their shopping cart, and track orders smoothly. The front-end uses HTML, CSS, and JavaScript to create a responsive, user-friendly design.

Order Confirmation and Receipt: After placing an order, users will see a confirmation page with order details like the product list, total price, and delivery date. They'll also get an email confirming their order and summarizing the details.

Admin Dashboard: Administrators see outputs like product inventory reports, order statuses, and customer feedback. The dashboard is designed to give clear, real-time updates on the system's performance and order management.

The system's output is clear, easy to understand, and visually appealing to help both customers and administrators take action quickly. The focus is on simplicity and accessibility to improve user satisfaction and efficiency

USE CASE DIAGRAM:

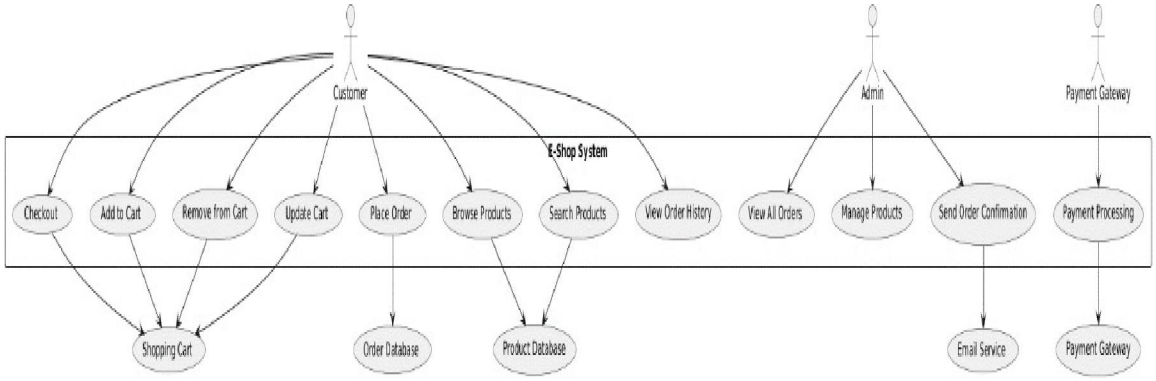

Fig.1: user case diagram

Level 0 Data Flow Diagram (DFD)

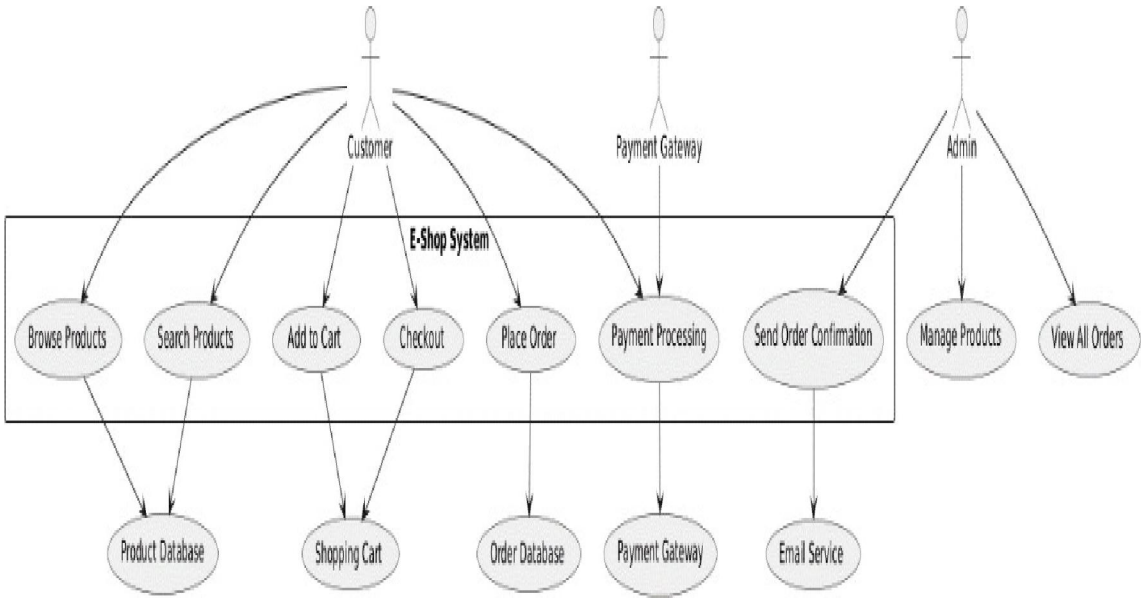

Fig.2: Level 0 Data Flow Diagram (DFD)

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Level 1 Data Flow Diagram (DFD)

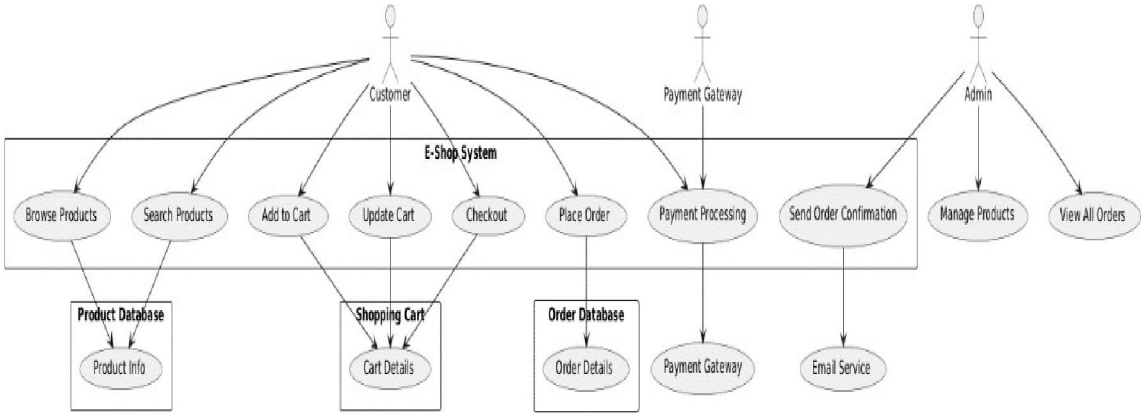

Fig.3: Level 1 Data Flow Diagram (DFD)

Sequence Diagram

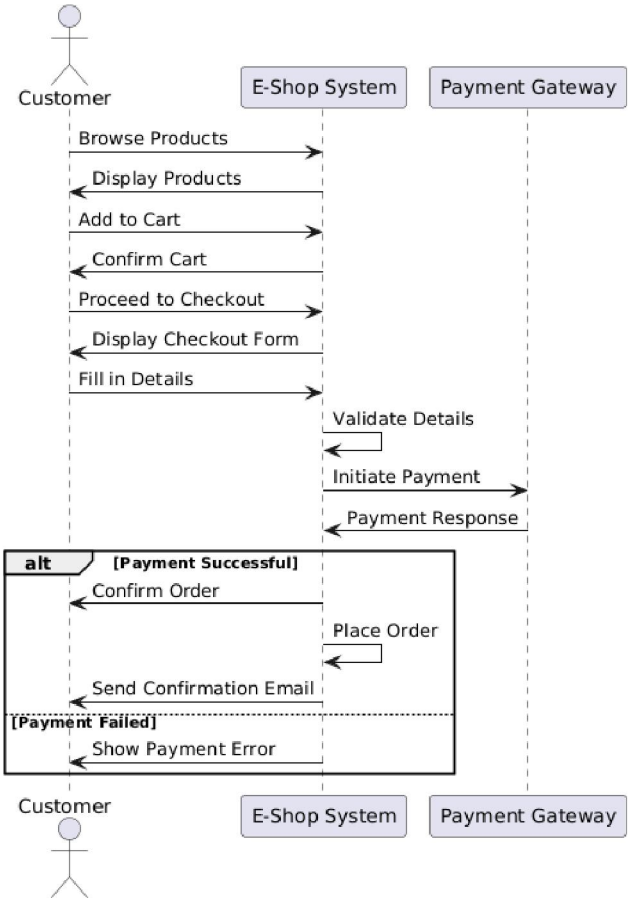

Fig.4: Sequence Diagram

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Activity Diagram

Fig.4: Activity Diagram

VI. PROJECT DESCRIPTION

Problem Definition:

The E-Shop System was developed to improve e-commerce operations by automating processes like product management, order processing, and customer interactions. It reduces the inefficiencies and errors that come with manual handling, allowing tasks like inventory tracking and customer management to be automated, which improves overall efficiency.

Project Overview:

The system has two main modules:

- Customer Module: This allows customers to register, browse products, manage their cart, and complete purchases. Customers also receive order tracking updates and email notifications.
- Admin Module: This enables administrators to manage products, track orders, update inventory, and generate reports. Admins can also send email notifications to customers about their order status.

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By automating key tasks, the system reduces manual work and enhances the user experience for both customers and administrators.

VII. SYSTEM TESTING

Testing:

Once development is complete, the system undergoes thorough testing to identify and fix any errors before deployment. The main goal of testing is to make sure the software works as expected and meets user needs.

Testing is done using two main techniques:

- **White-box Testing:** This focuses on testing the internal workings of the system. It checks the flow of the application and the logic behind functions like adding items to the cart, processing orders, and updating inventory. The goal is to find and fix any issues with the system's logic and data handling.
- **Black-box Testing:** This tests the system's external functionality, focusing on features like product search, payment processing, order confirmation, and email notifications. It ensures everything works from the user's perspective.

Both methods are used to find as many errors as possible and make sure the system is reliable, user-friendly, and ready for deployment. Test cases are created to simulate real-world scenarios and ensure the system functions properly in different situations

VIII. SYSTEM MAINTAINANCE

For the E-Shop System, maintenance will ensure the system runs smoothly and remains up to date. Key tasks include:

• Bug Fixes: Regular checks will be performed to fix any issues or glitches in the system.

• Feature Updates: New features will be added, and existing ones will be improved based on user feedback and new requirements.

• Security Updates: The system will be updated with security patches to protect customer data.

• Performance Optimization: The system will be regularly tested to maintain speed and efficiency, even as traffic grows.

• Technology Adaptation: The system will be updated to stay compatible with new technologies and software updates.

• Backup and Recovery: Regular backups will be taken to prevent data loss, and recovery procedures will be in place in case of system failure.

IX. CONCLUSION

The E-Shop System, built with Java, successfully automates e-commerce operations, offering a smooth and efficient experience for both customers and administrators. Key features like product management, order processing, and customer notifications are functioning seamlessly, and the system's performance meets user expectations. The user-friendly interface has been well-received, making the system a valuable tool for e-commerce businesses.

Scope of Future Development:

The E-Shop System has great potential for growth. Future developments could include integrating a real payment gateway, advanced inventory management, and personalized recommendations. The system can also be adapted for mobile platforms, with added features like real-time order tracking and customer reviews. As e-commerce trends evolve, the system is flexible enough to support these updates, ensuring long-term scalability.

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