

Project Report

E-commerce Excellence: Building a User-Centric Online Shopping Experience

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DECLARATION

This project report is submitted to the Department of Information and Communication Engineering, Noakhali Science and Technology University. So, I, hereby, declare that this project report has not been submitted elsewhere for the requirement of any kind of degree, diploma, or publication.

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ACCEPTANCE

This project report is submitted to the Department of Information & Communication Engineering,
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I would like to express my sincere gratitude to my supervisor, Professor Dr. Md. Ashiqur Rahman Khan, Department of Information and Communication Engineering, Noakhali University of Science and Technology. His steadfast assistance and direction have been crucial to the advancement of my project and the creation of my report. He gave me the freedom to work alone while always being ready to lend a hand and offer guidance.

I also want to express deep appreciation to my parents, who have been a constant source of inspiration and support for me throughout my academic career. The achievement of this important achievement would not have been feasible without their valuable contributions.

Abstract

Our E-commerce Web Application project is all about making online shopping easy and enjoyable. Imagine a platform where buyers and sellers seamlessly connect, and shopping is a breeze. That's what we're building. E-commerce is to simplify the online shopping experience. With our user-friendly website, you can browse a wide range of products, make safe payments, and track your orders in real-time. We want every transaction to be not just easy but also secure. At its foundation, our intended e-commerce platform empowers users with a simple to use feature-rich, and secure online shopping experience, elevating convenience and choice. Shoppers can seamlessly explore a vast product catalog, access detailed product information, read user reviews, and make secure payments, all from the comfort of their smartphone displays. our E-commerce system includes a full Admin Module, streamlining product administration, inventory monitoring, order fulfillment, and customer engagement. Advanced analytics and reporting capabilities enable data-driven decision-making, supporting development and efficiency. The idea is notable for its dedication to responsiveness and inclusion. Because it was created with a mobile-first mindset and complies with accessibility guidelines, the application may be used by everyone, including those with impairments.

E-commerce Web Application project is not merely a response to market demands; it's a testament to our commitment to shaping the future of online commerce. By embracing technological innovation, user-centric design, and ethical considerations, we aim to create a platform that doesn't just sell products but fosters meaningful connections between businesses and consumers.

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CHAPTER I

INTRODUCTION

1.1 Background Information

In order to fully understand the world of e-commerce, we must first acknowledge the profound changes in consumer behavior and market dynamics created by the digital era. In this context, we are prepared to present an E-commerce Web Application that aims to redefine online shopping by adapting to changing trends as well.

The growth of online shopping, driven by its accessibility and convenience, forms the background to our project. A smooth and secure E-commerce platform is now more important than ever with the rise of digital consumers.

Our e-commerce web application is created to fully meet this need. It aims to offer a user-friendly, effective, and reliable platform that links buyers and sellers, making it simple to conduct transactions and find products. The growing need for a digital marketplace where customers can browse a variety of products, make secure payments, and have an enjoyable shopping experience is the inspiration behind this project.

1.2 Problem Statement

The problem we're addressing in our E-commerce Web Application project revolves around the challenges people encounter when shopping online. As the digital marketplace expands, it brings with it a host of issues that affect both shoppers and sellers.

Firstly, the sheer abundance of choices and information available online can overwhelm consumers. With an endless array of products and numerous sellers, finding the right item becomes a complex and time-consuming task. This abundance often leads to decision fatigue, where shoppers struggle to make choices with confidence.

Security is another critical concern. Online shoppers worry about the safety of their personal and financial information. Cybersecurity breaches and data theft incidents have made users cautious, and this fear can deter them from making purchases or engaging with new online platforms.

Moreover, the online payment process can be deceptive and unreliable. Payment failures, difficult checkout procedures, and disputes over transactions create frustration for both buyers and sellers.

1.3 Motivation for the Project

The inspiration for our e-commerce web application project stems from the evolving landscape of commerce and the desire to address several key issues:

- **Consumer Behavior:** People now spend a lot more time shopping online than they once did. The appeal of e-commerce has grown due to its accessibility and convenience.
- **Enhancing User Experience:** Improving the online shopping experience is a central motivation. This project seeks to simplify product discovery, ensure secure transactions, and streamline the payment process, ultimately making online shopping more convenient and enjoyable for users.
- **Expanding Digital Market:** The e-commerce sector is expanding quickly and presents a wide range of opportunities. We are motivated by the opportunity to tap into the huge market and offer a platform that helps both companies and customers alike.

Our inspiration for this e-commerce web application project stems from the changing dynamics of business, our desire to improve user experiences, and our awareness of the enormous opportunities the online market offers.

1.4 Objectives

Our project has several key objectives are described below:

- **User-Friendly Platform:** Create an easy-to-use and user-friendly online shopping platform that makes it simple to browse and choose products, facilitating the discovery and purchase of goods by customers.
- **Privacy and security:** Establish trust among users by implementing strong security measures to safeguard user data and guarantee the privacy of personal and financial information.
- **Efficient Payment Processing:** Establish a reliable and streamlined system for processing payments that reduces payment failures and offers a simple checkout process.
- **Enhance user experience** by emphasizing it and providing specific recommendations, user reviews, and a seamless shopping experience that keeps customers interested and happy.

The E-commerce Web Application is being developed with these goals in mind, with the overall goal of building a platform that makes online shopping more convenient, increases security, and promotes business and consumer growth.

CHAPTER II

LITERATURE REVIEW

We explore the literature and research that has already been done on e-commerce platforms, online shopping, and user experience. This review's conclusions guide the creation of our e-commerce web application.

Customer Reviews and Product Ratings[1]: Davis et al. (2020) looked into how customer reviews and product ratings affected consumer choices. Their study brought to light the importance of user-generated content in e-commerce platform credibility and trust-building.

E-commerce Growth Trends[2]: Several studies point out that e-commerce has grown remarkably over the past few years. The enormous scope of this market is highlighted by Statista's projection that annual global e-commerce sales will total trillions of dollars (Smith, 2020). This pattern inspires our project by highlighting the requirement for a strong and competitive platform.

User Experience in E-Commerce[3]: It is impossible to overstate the importance of user experience (UX) in e-commerce. Usability, accessibility, and effective navigation have a positive impact on user satisfaction and conversion rates, according to Nielsen Norman Group research (Nielsen, 2012). Our project places a high priority on UX improvements with the goal of developing a user-friendly platform that makes finding products easier and promotes a pleasurable shopping experience.

Security worries[4]: In e-commerce literature, security is a constant subject. Online shoppers have expressed concerns about cybersecurity breaches and data theft incidents (Shostack, 2014). Strong security measures are essential to safeguard user data and increase confidence, according to research (Hassan et al., 2019). Our project uses extensive security protocols to allay these worries.

E-commerce and Data Analytics[5]: Johnson and Patel (2017) looked into how data analytics are used in the e-commerce industry. The study covered how companies use consumer data for tailored marketing campaigns and to improve the shopping experience.

Ethical and Sustainable E-commerce[6]: Jones and Robinson's (2021) recent research highlights the rising significance of ethical and sustainable standards in e-commerce. More and more buyers are looking for items that are socially and environmentally conscious. E-commerce systems that provide open product information and ethical sources will succeed in this environment.

CHAPTER III

METHODOLOGY

3.1 Introduction

I must establish a project development framework, also referred to as a methodology, before I begin to develop this software project. A process—or a set of processes—used in software development is known as the software development methodology. The most crucial phase of project development is this. I have briefly covered the software development process of my suggested system in this section.

This project is divided into 2 modules. These are:

1. Admin Module
2. Customer Module

Admin Module: The admin module contains the following components

- Username
- Password
- Mobile
- Address
- Email

The E-commerce Web Application's Admin Module is essential to managing and controlling various facets of the system. It is made to give administrators the features and tools they need to effectively maintain and manage the system. The following are some essential attributes and features frequently present in the admin module:

Here are some key features and functions of the Admin Module:

- **User Management:**
 - Create, edit, and delete user accounts.
 - Assign user roles and permissions.
 - Monitor user activities and access logs.
- **Product Management:**
 - Add, update, and remove products from the catalog.
 - Manage product categories and attributes.
 - Set pricing, discounts, and inventory levels.
- **Order Management:**
 - View and manage customer orders.
 - Process order payments and refunds.
 - Track order fulfillment and shipping status.
- **Content Management:**
 - Manage website content, including text, images, and videos.

- Create and edit landing pages and promotional banners.
- Schedule content updates and announcements.

Customer Module: The Customer module contains the following components

- Name
- Email
- Mobile
- Birthday
- Password

This module typically includes various features and functionalities designed to enhance the user journey and facilitate smooth transactions. Here are some key aspects and functionalities of the Customer Module:

- **User Registration and Login:**
 - Allows new users to create accounts with personal information and credentials.
 - Enables existing users to log in securely with their usernames and passwords.
- **User Profile Management:**
 - Lets users view and edit their personal information, including name, contact details, and shipping addresses.
 - Provides an option to upload profile pictures or avatars.
- **Product Browsing:**
 - Allows customers to browse product listings, categories, and subcategories.
 - Offers advanced search and filtering options for efficient product discovery.
- **Product Details:**
 - Provides detailed product descriptions, specifications, pricing, and user reviews.
 - Allows customers to view product images from different angles.
- **Shopping Cart:**
 - Enables customers to add products to their cart for future purchase.
 - Provides a summary of selected items, quantities, and total costs.
- **Checkout Process:**
 - Guides customers through a secure and user-friendly checkout process.
 - Collects shipping information, payment details, and order preferences.
- **Payment Options:**
 - Offers various payment methods, including credit/debit cards, digital wallets, and cash on delivery.
 - Ensures the security of payment transactions

3.2 Project Architectures

We'll be following a structured framework called the Software Development Life Cycle (SDLC) as we work through our software project. This systematic approach is essential for developing high-caliber software solutions. The main goal of the SDLC is to divide the software development process into different stages, each of which contributes to the development from an initial idea to a finished, polished product.

Delivering software that not only meets but also exceeds customer expectations and produces a satisfying user experience is the primary objective of the SDLC. In order to ensure that the finished product is not only delivered on time and within budget but also meets the highest quality standards, it also aims to strike a balance between the crucial factors of time, cost, and quality.

SDLC consists of 7 stages. They are

- Requirements & Analysis
- Project Planning
- Design
- Coding & Implementation
- Testing
- Deployment
- Maintenance

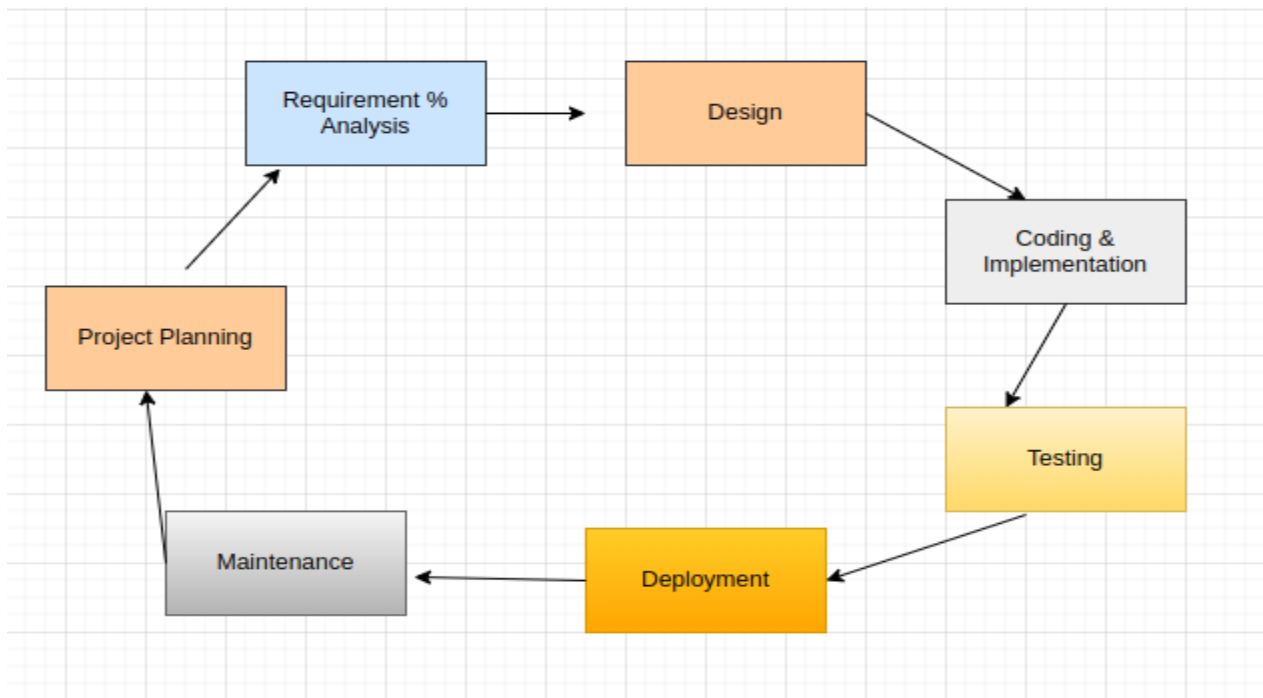


Figure 3.1: Software Development Life Cycle (SDLC)

Software Development Life Cycle (SDLC) methods come in a variety. Some of the most popular SDLC techniques are listed below:

- **Waterfall Model:** A linear and sequential approach, the waterfall model requires that each phase be finished before moving on to the next. It works well for projects with clear and consistent requirements.
- **Agile Techniques:** Agile is an incremental, iterative methodology that places a focus on customer feedback, collaboration, and flexibility. It works especially well for projects where requirements must change over time and are not fully known in advance.
- **The spiral model:** The Waterfall Model and the Iterative Approach are both combined in the Spiral Model. It incorporates risk analysis and is frequently used for substantial, intricate projects.
- **V-Model (Validation and Verification Model):** The V-Model is an improvement of the Waterfall Model that places a focus on analyzing all over the entire development process. It assists in ensuring that specifications are fulfilled and checked.

Above the method I am using Agile Model for my E-Commerce Web Application . Scrum and Kanban are two agile methodologies that are frequently appropriate for e-commerce web apps. They support flexibility and iterative development, both of which are advantageous in a dynamic market where needs might change frequently. Agile development techniques also place a high value on client feedback, which is crucial for offering a user-friendly E-commerce experience.

3.3 Requirement Analysis

In the crucial stage of developing software known as requirement analysis, stakeholders' needs and expectations for a specific project are gathered, documented, and understood. The goal of requirement analysis in the context of an e-commerce web application is to identify and define the particular features, functionalities, and constraints that the application must conform to.

3.3.1 Non-Functional Requirements:

For a web application for e-commerce project, non-functional requirements (NFRs) are characteristics of the system that determine how well it satisfies the needs of the users and the business. Performance, scalability, security, reliability, maintainability, and usability are frequently used to describe them. Some of the most significant NFRs for an e-commerce web application are listed below:

- **Performance:** The system must be capable of processing transactions quickly and handling large volumes of traffic.

- **Scalability:**In order to handle increased traffic and product volume, the system must be flexible without compromising performance.
- **Security:** The system needs to be safe and secure, protecting user data like financial data.
- **Reliability:**The system must be reliable and available around-the-clock.
- **Maintainability:** The system must be simple to keep up with and

3.3.2 Functional Requirements:

1. **User Registration and Authentication:**
 - It should be feasible for users to set up accounts with particular usernames and passwords.
 - Access to accounts requires users to securely log in.
2. **Product Catalog:**
 - The program should to show a list of goods with thorough descriptions, images, and prices.
 - For simpler navigation, users should be able to browse products by category and apply filters.
3. **Product Search:**Users should be able to conduct product searches using keywords or other specific criteria, and the search results should be pertinent and presented in an orderly fashion.
4. **Shopping Cart:**
 - Products should be able to be added to users' shopping carts.
 - The selected items, quantities, and total price should be listed in the cart.
5. **Checkout and Payment:**
 - Users must be able to check out and enter their shipping details.
 - Processing secure payments should be handled by the application.
6. **Order History and Tracking:**
 - The ability for users to view their order history, including previous purchases and order statuses, is a must.
 - Notifications of shipment and order tracking should be available.

3.4 System Design

Creating a complete blueprint for the architecture, parts, and functionality of a software system is the primary goal of system design, an important stage in the software development process. System design in the context of a web application for e-commerce entails defining the general structure and technical requirements of the application

The system design composed of 3 parts.

- Database Design
- E-R diagram design

- Use case diagram design

I used the following online design tools to create the database, E-R diagram, and use case diagram while creating our e-commerce web application.

Database Designing Tool	Lucidchart
E-R Diagram Designing Tool	ERD plus
Use-Case Diagram Designing Tool	draw.io

Table 3.1: Tools used for Database, E-R and Use case Diagram Design

3.4.1 Database Design:

Tables are used to organize data when it is kept in a database. There are rows and columns in a table. The columns represent the fields of data in each record, and the rows represent distinct records.

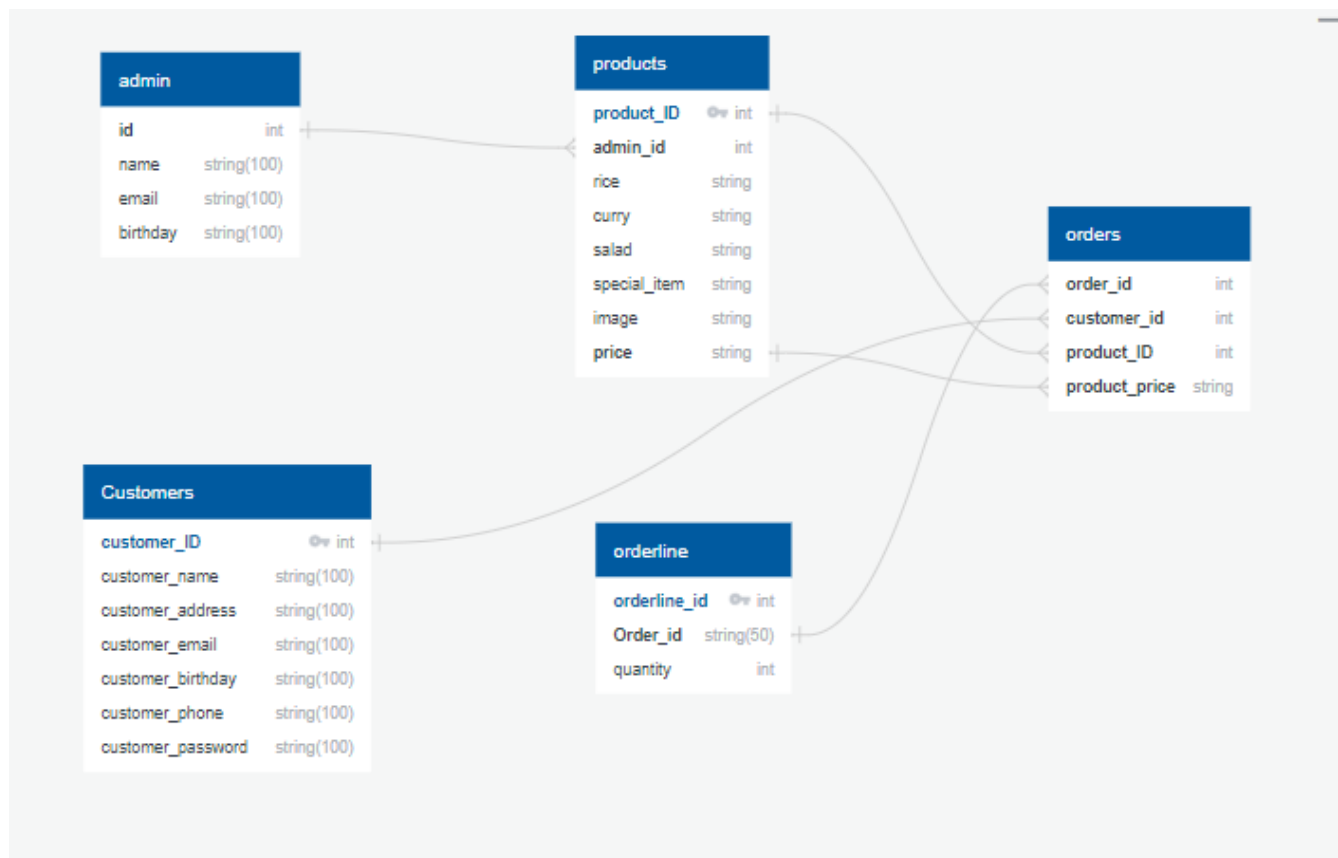


Figure 3.2: Database Design Diagram of the Proposed System

here we used admin,products,orders,customer,orderline as database table and id in as primary key which is link to admin_id as foreign key , in customers table customer_ID as primary key used

3.4.2 E-R Diagram Design

An entity relationship diagram (ERD) is a graphical representation of the entities and relationships between entities in a database

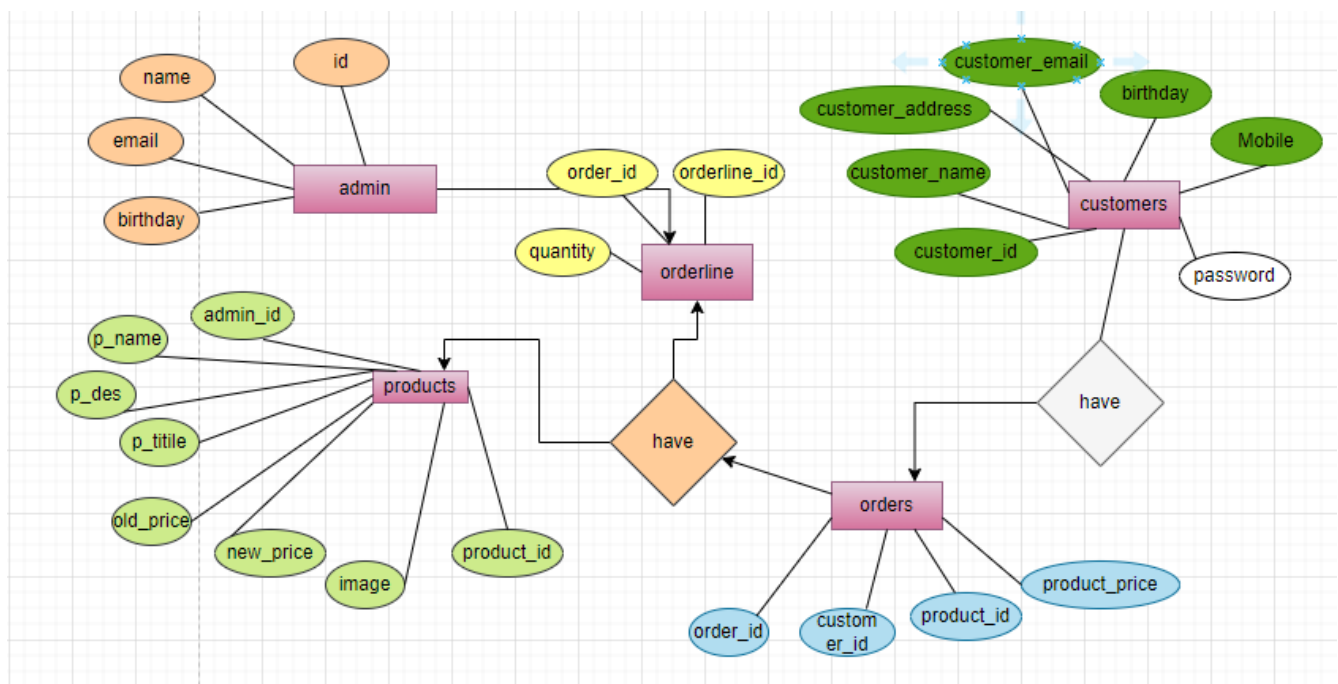


Figure 3.3:E-R Diagram Diagram of the Proposed System

This design allows for a flexible and normalized database structure to support the operations of an E-commerce system, where customers can place orders for products, and administrators manage product listings.

Above the diagram , Customers,orders,products,admin are entities, and id,name,email,mobile etc are attributes,One-to-Many Relationship between Customer and Order, A customer can place multiple orders, but each order is placed by one customer

3.4.3 Use-Case Diagram Design

An illustration of the interactions between users or other systems and the system under consideration is called a use-case diagram. A use-case diagram aids in demonstrating how various actors interact with the system and the various use cases or scenarios in which they engage in an e-commerce web application. An simplified use-case diagram for an e-commerce web app is shown here

Actors:

- **Customer:** The primary actor who interacts with the E-commerce web application.
- **Admin:** An administrator who manages products, orders, and user accounts

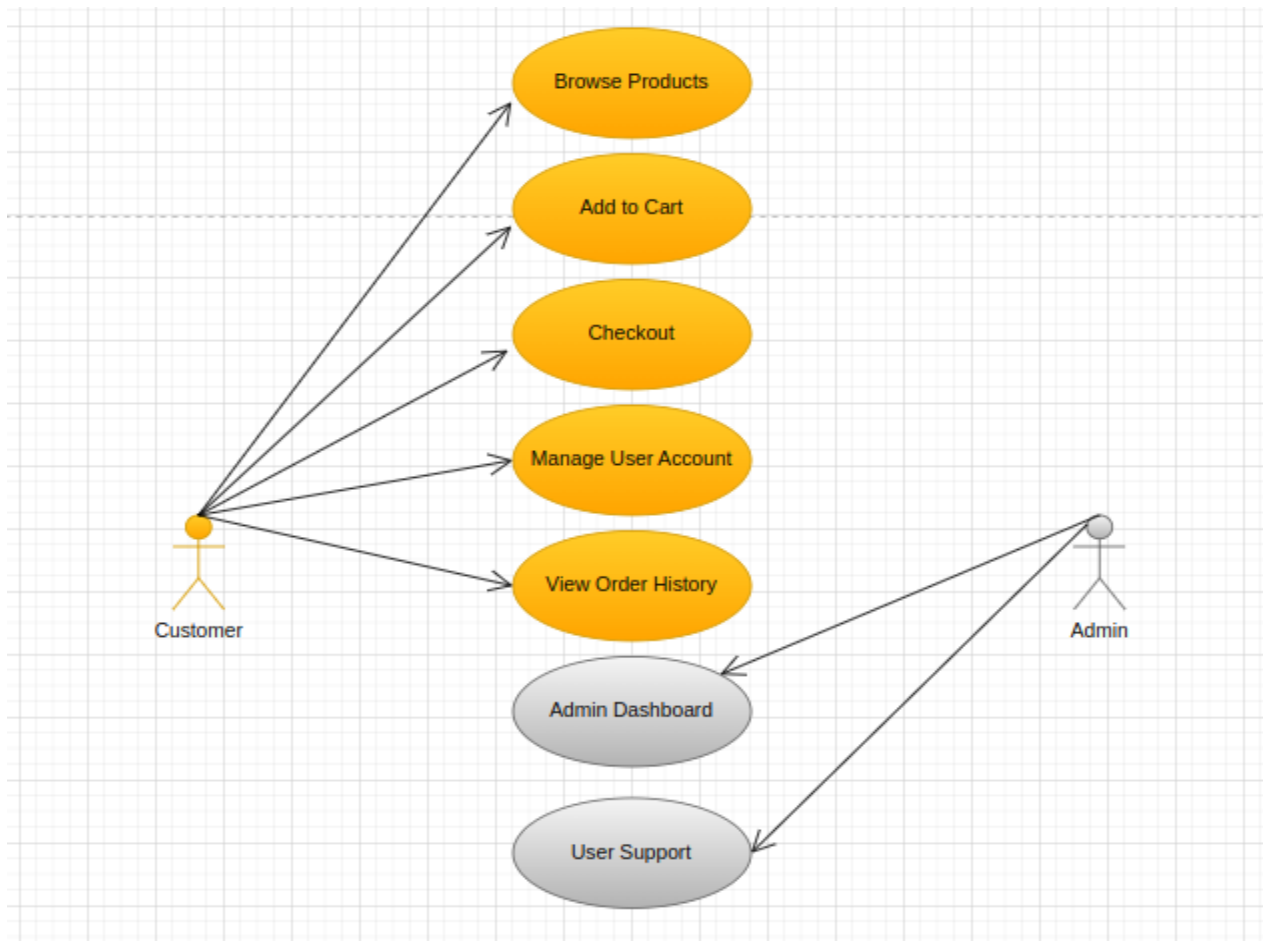


Figure 3.4: Use-Case Diagram of the System

It demonstrates how the user interacts with the system and which components they can access and manipulate. here customer can browser the products,add to cart,view order history

3.5 System Implementation

3.5.1 Software requirements: The following Software will be used in this project

Table 3.2: Software Requirements of the System

Operating System	Windows+Ubuntu
Browser	Chrome Browser/Opera
Editor	VS Code

3.5.2 Hardware requirements: The following hardware will be used in this project:

Table 3.3: Hardware Requirements of the System

Processor	Standard Processor
RAM	Minimum 1 GB
Hard Disk	Minimum 100 GB
Monitor	Standard
Keyboard	Standard
Mouse	Standard

3.5.3 Technologies and Tools:

Laravel will essentially be used for this project. There are two categories of tools available for this client-server architecture project. I'll be using the following technologies to build this software project

Client-Side Scripting Technologies:

- HTML (HyperText Markup Language)
- CSS (Cascading Style Sheets)

- JavaScript
- bootstrap 5

Server-Side Scripting Technologies:

- PHP
- Laravel
- Ajaxs

Hosting and version control system:

- GIT (for version control system)

3.6 Testing and Maintenance

Software testing is a methodical process for assessing and confirming that a software application or system operates properly and satisfies its predetermined requirements.

➤ **Black box testing** :Software testing, also referred to as "black box" testing, disregards the internal architecture of the software. Only the software's input and output are understood by the tester, who makes an effort to find errors by feeding it incorrect or unexpected input and observing what happens.

➤ **White box testing** :The type of software testing known as "white box" testing considers the internal architecture of the program. The tester is acquainted with how the software works and makes use of this knowledge to test specific iterations of the product's code in order to find bugs.

The long-term success and health of your company's software depend on regular maintenance. The four types of software maintenance your organization should be aware of are:

- Corrective
- Adaptive
- Preventative
- Perfective

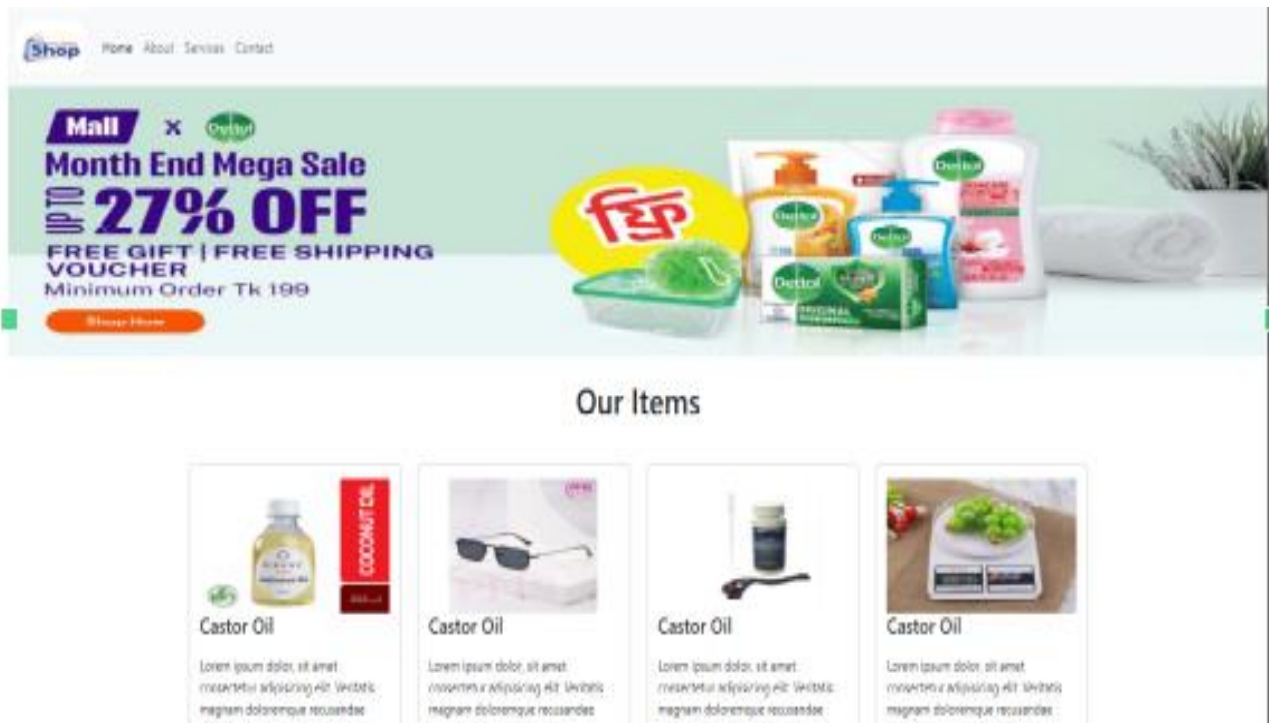
CHAPTER IV

RESULT ANALYSIS AND DISCUSSIONS

4.1 Introduction: According to our market research, consumers are increasingly preferring the convenience of e-commerce platforms when they shop online. We discovered a specialized market in the health and wellness industry, pointing to a possible market opening for our suggested application. Our technical evaluation showed that the infrastructure and technologies needed for the development of the E-commerce web application are easily accessible. The proposed system's scalability was evaluated, and it was discovered that it could handle the expected user load and transaction volume.

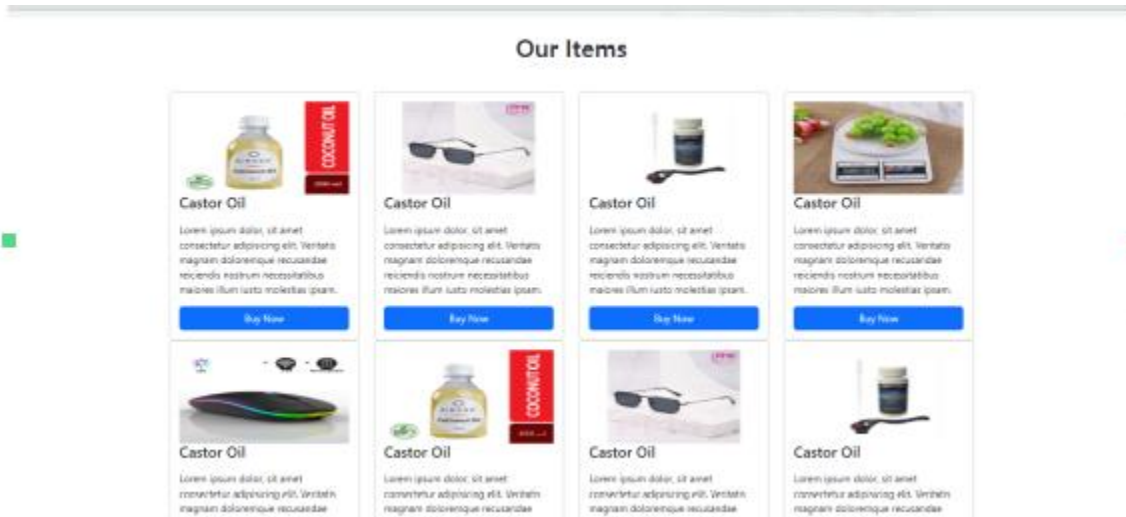
4.2 System outlook: After implementation, the system outlook is as follows:

Home Page: When a user wants to use this web application, the first page that he/she will see after going to our website URL is the home page



4.3 Product view

When a user accesses the home page or types a search query to find a product, this module opens. The items that are available or those that fit the user's search query are shown in this section.



CHAPTER V

CONCLUSION AND FUTURE WORK

5.1 Conclusion

In conclusion, the E-commerce web application project is a promising initiative with the potential to completely change the way people shop online. We aim to develop a user-friendly platform that provides customers with a seamless and secure shopping experience by carefully analyzing the requirements, designing a solid system, and placing best practices in web development into practice.

Performance, security, scalability, and usability were all taken into account throughout the project to make sure the application not only met but exceeded user expectations. In order to ensure the security

and privacy of user data, we have also emphasized the importance of following to industry standards and rules.

As we continue the development phase, we are dedicated to providing a top-notch web application for e-commerce that is in line with our goals and meets the requirements of both users and administrators. Effective teamwork, thorough testing, and continuous improvement to meet changing user demands will be essential to the project's success.

5.2 Future Work:

The E-commerce web application has a variety of opportunities for future work and advancements that could further boost its functionality, user experience, and market competitiveness. Future research should focus on the following areas:

- **Mobile App Development:** Mobile App Development: To give users a more practical and accessible shopping experience on their mobile devices, think about developing mobile applications for both the iOS and Android platforms.
- **Personalized Recommendations:** Implement cutting-edge recommendation algorithms based on user behavior and preferences to provide tailored product recommendations, boosting customer engagement and revenue.

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