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E-commerce web: Deshal (clothes & fashion)

Islam, Fayeeza Subah

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E-commerce web: Deshal (clothes & fashion)

By

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Autumn, 2022

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January 22, 2023

Dissertation submitted in partial fulfillment for the degree of Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

This attestation serves to confirm that the report entitled "E-commerce web: Deshal (clothes & fashion)" has been executed by me, **Fayeeza Subah Islam (1920044)**, and submitted as a component of the requirements for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). The report was completed under the guidance of Mr. Mahmudul Islam Sir (Supervisor). I further attest that all the work presented in this report is entirely original and was acquired during my tenure as an intern. All sources of information utilized in the project and report have been duly acknowledged and cited in accordance with academic standards.



19/01/2023

Signature

Date

Fayeeza Subah Islam

Name

Acknowledgement

First and foremost, I extend my sincerest gratitude to the **Almighty Allah** for His benevolent grace in enabling me to successfully complete my internship report within the designated time frame.

I am deeply appreciative of the Faculty of Computer Science and Engineering department for including an internship course CSE499 within the graduation program curriculum, and for providing me with the opportunity to gain hands-on experience in the field of my interest. I extend my heartfelt thanks to my supervisor, Mr. Mahmudul Islam, CSE R&D Officer, for his unwavering encouragement, guidance, invaluable instructions, stimulating suggestions, and thoughtful advice throughout the duration of my internship and the preparation of this report.

I am deeply appreciative of the esteemed members of AlterSense Limited for providing me with the opportunity to undertake my internship as part of my graduation program curriculum and for granting me the invaluable experience of industry-oriented tasks and the field of work. My heartfelt thanks go to the entire Heilos team, including my technical supervisor Farhad Ahmad, Lead Full-Stack Engineer, for their unwavering encouragement, guidance, invaluable instructions and thoughtful advice throughout the duration of my internship and the preparation of this report. I am particularly grateful to my colleagues Md. Rafiqul Islam, Full Stack Engineer, and Shazzadul Islam Mun, AI Engineer, for their immense support during my time at the company and in the preparation of this report and other documentation related to my internship. My appreciation extends to all members of the Helios team, who have consistently offered their advice and assistance. Furthermore, I must acknowledge the congenial working environment and team cohesion of the organization which has enabled me to effectively navigate a wide range of tasks and challenges.

Lastly, I would like to express my gratitude to my parents and my siblings for their unwavering support throughout this phase. Their sacrifices and dedication have been integral to my success and for that I am eternally grateful.

Letter of Transmittal

Mr. Mahmudul Islam
CSE R&D Officer
Department of Computer Science and Engineering
School of Engineering and Computer Science
Independent University, Bangladesh

Subject: **Submission of Final Internship Report in Compliance with Graduation Requirements.**

Dear Sir,

With due respect, I am submitting my Internship Report, which is a requisite component of my Bachelor's degree in Computer Science and Engineering. It is a profound honor to have had the opportunity to work under your esteemed guidance. This report is a result of my internship tenure at AlterSense Limited, where I was privileged to work for a period of three months under the supervision of Farhad Ahmad, a Full Stack Engineer at the company. This internship afforded me the opportunity to gain both theoretical and practical knowledge, as well as to establish professional connections. I have made a conscientious effort to ensure that this report is as informative and comprehensive as possible, by incorporating the skills and knowledge that I acquired during my internship. I have adhered to the guidelines provided and have furnished sufficient detail in the report. I am convinced that this report will satisfactorily fulfill the purpose of my internship program.

I would be deeply appreciative if you would kindly review the report and offer your invaluable feedback. It would be a great honor if you found the report to be informative and of use in gaining a clearer perspective on my internship experience.

Sincerely,

Fayeeza Subah Islam
ID: 1920044
Department of Computer Science and Engineering
Independent University, Bangladesh

Evaluation Committee

Asif Bin Khaled

Signature

Asif Bin Khaled 30.01.23

Name

Internal Examiner-1 / Panel Member-1

Signature

Md. Mahmudul Kabir Pegal

Name

External Examiner-2 / Panel Member-2

Signature

Mahmudul Islam

Name

Supervisor of the intern

Signature

Name

Head, Department of Computer Science & Engineering

Abstract

As an intern in the software engineering division of AlterSense Limited, I had the opportunity to gain valuable hands-on experience in the field of website application development through an immersive and multifaceted internship experience. I was initially assigned to work on the front-end design and documentation for an ongoing project, which served as an introduction to the company's software engineering working process and allowed me to develop my technical skills and understanding of industry best practices as a Full-Stack developer.

However, as I progressed through the internship, I was presented with the opportunity to work on an e-commerce clothing website project. This experience was particularly transformative as it not only allowed me to utilize and enhance my front-end design and development skills, but also introduced me to the realm of back-end development, such as data storage and retrieval, payment gateway integration, and inventory management. The implementation of these functionalities required a high level of attention to detail, problem-solving skills and critical thinking, I also have been assigned to improve the website structure, layout, and design, improve the user experience and navigational flow of the site, and implement functionalities such as search and sorting.

The purpose of an internship is to bridge the gap between theoretical knowledge and practical application, and I can attest that this was achieved during my tenure at AlterSense Limited. Through this internship, I gained a thorough understanding of the software engineering process and the key skills required to work in the field as a Full-Stack Developer. Additionally, I also developed my communication and teamwork skills, which will be invaluable as I enter the workforce. This internship experience was truly a transformative one, and I am confident that it will serve as a valuable foundation for my future career in software engineering for website application development.

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Chapter 1

Introduction

A student's academic and professional aspirations are frequently very closely tied to internships. The goal of an internship program is to assist students in focusing on their potential and professional preferences. The whole program reserves the right to allow participants to learn, observe, and decide their goals and objectives. An internship allows students to apply their academic knowledge to challenging real-world situations. Under **Independent University, Bangladesh** (IUB), the department of Engineering, Technology & Sciences provides a Bachelor's degree program in **"Computer Science and Engineering"** which requires us to complete an Internship Program (CSE499) with an established IT company where I will encounter practical projects and real-life world experience in the IT industry. I have been working as an intern in an IT company named AlterSense Limited for three months. In the following sections, I will discuss what I will contribute to the company.

1.1 Overview/Background of the Work

Problem Statement: As an intern, the most significant hurdle is putting academic principles into practice. On September 1st, 2022, I began my internship as a software engineer at AlterSense Limited where I have been assigned to work, in order to contribute to the development on an e-commerce website project for the renowned clothing brand Deshal. Nowadays, in these digital times a vast client base can be accessible easily through an e-commerce site . However, there is fierce rivalry among several e-commerce websites especially, in terms of user experience. Any customer anticipates in finding what they seek quickly and simply when they visit a purchasing website. Sometimes, the brands and tangible things that people desire to buy are also unknown to them however they do have a general concept of what they wish to get. These days, many consumers look up things on Google rather than individually browsing for any websites being under the impression that Google will direct them to that product's site. Hence an e-commerce website's goal

is to assist users in condensing their broad concepts and enabling them to complete the items. By maintaining the above target, our website aims to bring together more than 200 rural artisans and craftspeople, forming a close-knit community. With a contemporary deshi twist, it focuses on handcrafted, native, and indigenous items worldwide. It aims to provide a platform for both seller and buyer.

1.2 Objectives

- Customized e-commerce platform performing quick as well as easy check-outs, improved product information, top rated product filtration, and more
- Monitoring number of products sold per day along with track of ratings of brand in order to generate fresh leads for company business.
- By studying the statistics, a business may determine various factors to help in sorting the data that can assist with the next product releases and the creation of a long-term marketing strategy.
- Design a better User Interference.
- Having secure user authentication.
- To integrate a system to allow an online payment option.
- Access or retrieve user registration information and client information.

1.3 Scopes

The website will allow new customers to register and current customers to log into the system. Customers can search for the annual collections from the recent displayed products. They can choose a particular seasonal wear and view its details. After adding items to the cart, they can check out filling in the shipping details following which they will be guided to payment interference option, finally confirming the order, if however, any user logs out without confirming the order then he/she after logging in will be able to continue from the same page, where they left off. The system admin panel will able to perform administration activities, in which the admin will add new categorized products as well as update product information, delete any old product, and access buyer's information, mark delivered orders as well as review product statistics.

Chapter 2

Literature Review

A literature review is a critical summary of what has been published on a particular topic. It typically includes a summary, analysis, and evaluation of the relevant literature. The purpose of a literature review is to provide a comprehensive overview of the current state of knowledge on a topic, and to identify areas that require further research. In addition to summarizing the existing research, a literature review may also identify gaps in the literature and suggest areas for future study. Literature reviews are commonly found in academic papers, dissertations, and other research documents, and may be included as part of the introduction or as a separate section. Conducting a literature review can be a valuable and important part of the internship project, as it helps to ensure that the project is focused, relevant, and rigorous.

2.1 Relationship with Undergraduate Studies

This web development project will be aided by the knowledge and abilities learnt in undergraduate courses. These courses provide the conceptual foundation that will be required to complete this project. Several of the courses include:

- **CSE203+L - Data Structure:** The focus of this course was on teaching students how to manage and operate complicated arrays, objects, stack, queue, arrays of objects, objects of arrays, nested arrays, pointers as well as other structures. The knowledge obtained from this course allowed the handling of the numerous complicated data structures involved in this e-commerce project considerably simpler.

- **CSE211+L - Algorithm:** The focus of this course was on teaching how to determine if a problem can be solved or not by doing analysis and whether the problem has one or more workable solutions. To develop systems, components, or processes that suit specific objectives while taking into account public health and safety, cultural, social, and environmental factors, the idea involved a very crucial part in this project's outline.

- **CSE213+L - Object Oriented Programming:** This course takes a deep dive into programming of what are classes and their objects. Additionally, it taught students how to create building blocks, which reduced repetition and increased the reuse of codes. It involves the practise of how beneficial is it to create project code in independent pieces. Using pieces of older blocks and adding new functionality to them can also assist prevent building new codes from scratch as the system gets bigger, thus also played an important part for the this project development.

- **CSE303+L - Database Management:** This was a very major essential course that included project planning and design thus a course that taught how to work using a database. It addressed well-known planning as well as strategy techniques such as the System Development Life Cycle, Rich Pictures, Requirement Analysis, Entity Relationship Diagram, Business Process Model, Normalization, Data Dictionary, and many more. These methods were extremely beneficial during the project's development stage involving planning and strategy.

- **CSE307 - System Analysis and Design:** The introduction of how to manage stakeholders, the methods as well as tools required for designing and analyzing information systems were covered in this course. Systems and models, project management, decision tables, sequence & activity diagrams, object-oriented analysis, use-case modeling, United Modeling Language, feasibility analysis, structured analysis, systems prototyping, system design and implementation, application architecture, user interface design, front-end, and back-end tech stack, database, and systems analysis are several of the topics covered. All of these lessons aided in completing the project.

- **CSE309 - Web Applications and Internet:** The development of web applications was covered in this course. These included HTML, CSS, Bootstrap, JavaScript, PHP, and the idea of integrating technology with a database, hosting it as well, along with the concept of API, all of which are the things we came across. As the project is a web application constructed using web technologies and contains a back-end server that had to be delivered to the server as well, along with this a well-designed front-end involving the tools and technologies taught in this course had greatly assisted in the project's development.

2.2 Related works

These are some of the related works on full-stack software projects especially involving Node.js (Express), React.js and MongoDB, also abbreviated as MERN tech stack such as:

1. E-Commerce web application by using MERN Technology: This is an e-commerce website built for buying different types of T-shirts, with multiple views for user and admin integrated with payment gateway as well as CRUD operations. [1]

2. Social Media Posting Platform using Node.Js: A social-media website built using MERN and allows users from different domain ranges to communicate, and send messages enabling an easy build-up of social circle. [2]

3. Big Buy Application: An e-commerce website was built for buying clothes and electronics, mainly focusing on user-friendly UI and smooth usage. [3]

4. Design & Development of E-commerce Web Application for Cooperative Store: An e-commerce site for keeping record entries to minimize sales workforce as well as manual human errors and display user preference products based on longevity of their use. [4]

5. E-Commerce website using MERN Stack: An e-commerce website whose main target is customers as a whole and it consists of an admin panel with CRUD operations and a panel for registered users to update their username and password. [5]

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

The work breakdown structure (WBS) diagram is a useful tool for organizing and planning the various stages of a project. It represents the complete range of activities, deliverables, and work packages required to successfully complete the project from start to finish. At the top of the WBS diagram is the final project product, along with the associated activities and work packages that are needed to produce it. The WBS provides a clear and structured overview of the work that needs to be done in order to achieve the project's objectives.

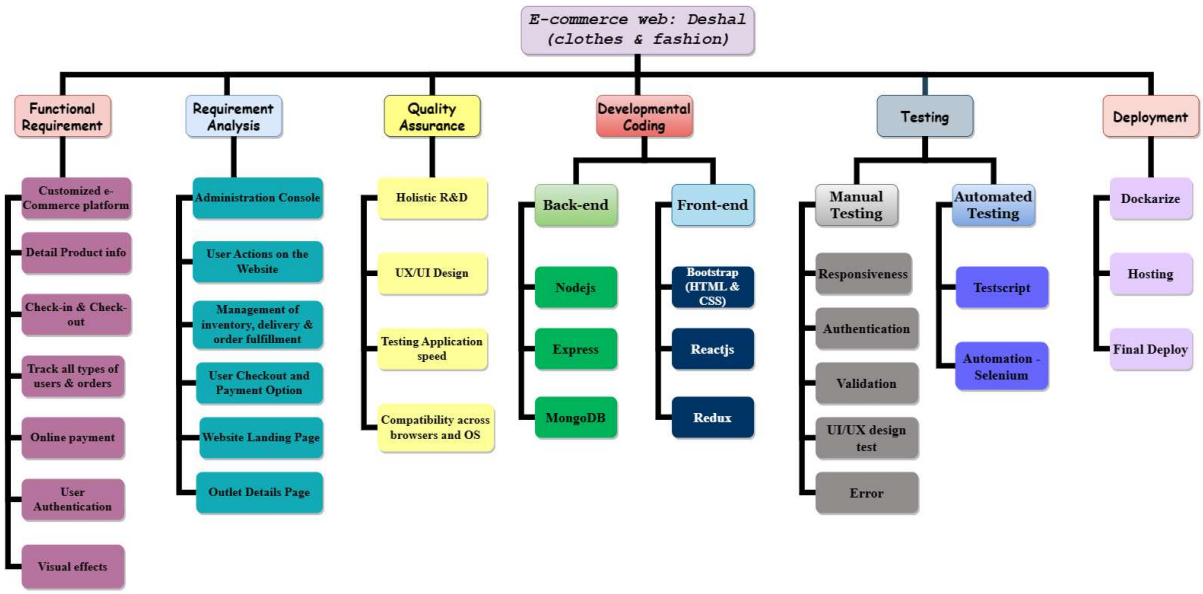

Figure 3.1: Work Breakdown Structure

3.2 Process/Activity wise Time Distribution

The given project management strategy involves dividing the project into smaller work activities and displaying them in a logical flow, which allows for the estimation of the project's overall duration based on the expected completion times of each activity. Tasks that must be prioritized and completed promptly are identified, and the critical path - the sequence of planned activities that determines the duration of the project - is identified. This critical path is a well-known concept in the field of project management, recognized globally.

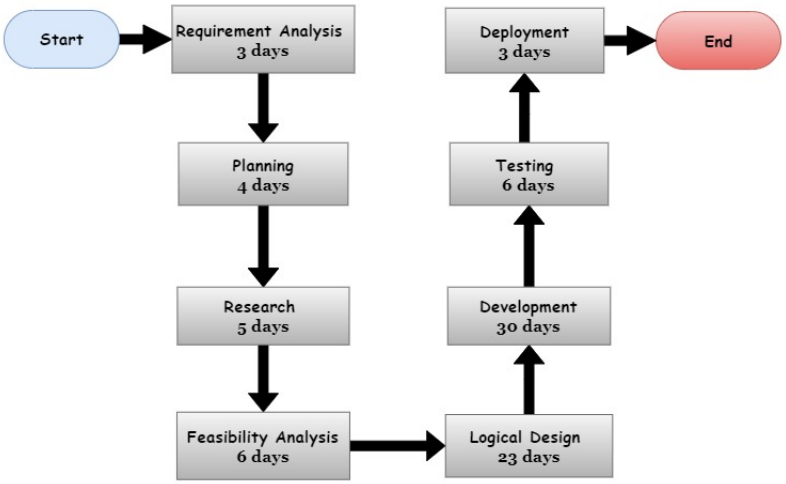

Figure 3.2: Critical Path method

3.3 Gantt Chart

Gantt charts are a useful tool for project planning and management, as they help to visualize the tasks, resources, and timeline for a project. They are useful for optimizing resource allocation, monitoring progress, and identifying potential delays. In short, Gantt charts aid in task planning and scheduling and are crucial for controlling task inter-dependencies.

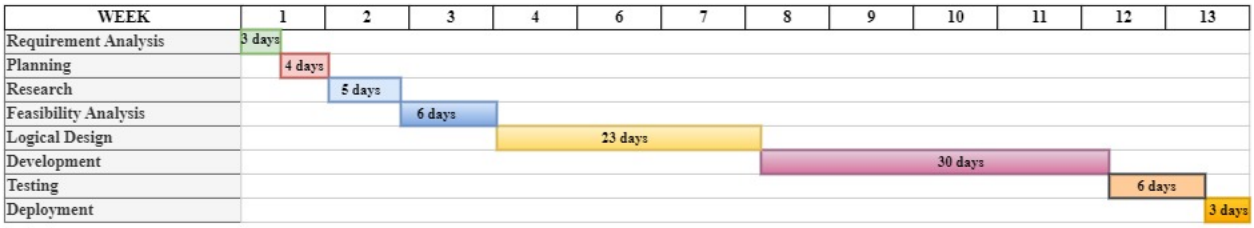

Figure 3.3: Gantt Chart

3.4 Process/Activity wise Resource Allocation

Resource allocation refers to the process of assigning the most appropriate resources to tasks and projects. Resource management involves effectively managing workloads to avoid over or under utilization, and personnel may be reassigned as needed based on the availability of resources and project timelines. This helps to ensure that resources are being utilized efficiently and effectively.

- **Requirement Analysis:** The success or failure of a systems or software project is often determined by the quality of the requirement analysis. This process allows organizations to gain a deeper understanding of the current system and the needs of stakeholders, and it helps the development team to communicate with stakeholders using visual aids such as charts, models, and flowcharts. Approximately 3 days were allocated for the requirement analysis of this project.

- **Planning:** Effective project planning is crucial for successful software development, as it helps to identify the tasks that need to be completed and coordinate how they will be distributed among team members. Project planning is a structured and comprehensive process that focuses on the activities necessary to effectively complete the project, and it helps to avoid roadblocks such as changes to plans or a lack of resources. It also aids in better time and resource management. In this project, 96 hours were initially allocated for planning.

- **Research:** Five days were allotted for research in this project. This research was necessary in order to design the web application, as it involved determining the most efficient tech stack for the back-end and front-end and answering questions such as how to create and design the application, how to automate it, and how to evaluate the quality. The research also involved considering which design would be best for the application.

- **Feasibility Analysis:** A feasibility study is an assessment of the operational, technical, and economic aspects of a proposed project. It is used to determine whether the project is feasible and to recommend alternative approaches if necessary. This analysis is typically conducted at the beginning of the project, before significant resources have been invested, and it helps to determine whether or not an information system project can be completed. In this case, approximately 6 days were allocated for the feasibility analysis.

- **Logical Design:** Effective UI/UX design is crucial for e-commerce platforms as it can significantly impact engagement and productivity. In fact, research has shown that it takes just 50 milliseconds for a person to decide whether they like a website

based on its design. This underscores the importance of good UI design. Our UI/UX designer had approximately 23 days for the logical design of the project.

- **Development:** At this stage, the web page designs had been completed, and the developers had started working on the code for the front and back end of the program. The entire process took approximately 720 hours, or four weeks.
- **Testing:** At the end of the implementation phase, unit testing for the application began. During this phase, the team evaluated aspects such as manual authentication, website responsiveness, and design. This process will be repeated for a total of 144 hours, or six days.
- **Deployment:** Finally, at the end stage, deployment will be completed. Deployment is the process of making the e-commerce business accessible and usable online through domain hosting on a server. For this, a designated time-frame of three days has been set.

Process/Activity wise Resource Allocation		
Process	Days	Estimated Work Percentage
Requirement Analysis	3	3.75%
Planning	4	5.00%
Research	5	6.25%
Feasibility Analysis	6	7.50%
Logical Design	23	28.75%
Development	30	37.50%
Testing	6	7.50%
Deployment	3	3.75%
Total	80	100%

Figure 3.4: Process/Activity wise Resource Allocation Table

3.5 Estimated Costing

The cost of software development can vary significantly depending on the complexity of the project, the features required, the technologies used, and the programming languages employed. In this case, the estimated cost for the entire project, including deployment, is approximately Tk 3,52,800 (BDT). If additional costs such as maintenance



Figure 3.5: Process/Activity wise Resource Allocation Chart

of the website are required, they will be taken into consideration after the project has been deployed.

Cost Estimation	
Features	Estimated Costs
Internet	6000
Hosting	1800
Front-End Developer	60,000
Back-End Developer	80,000
UI/UX Designer	45,000
Laptop	1,50,000
Others	10,000
Total	3,52,800

Figure 3.6: Cost Estimation Table

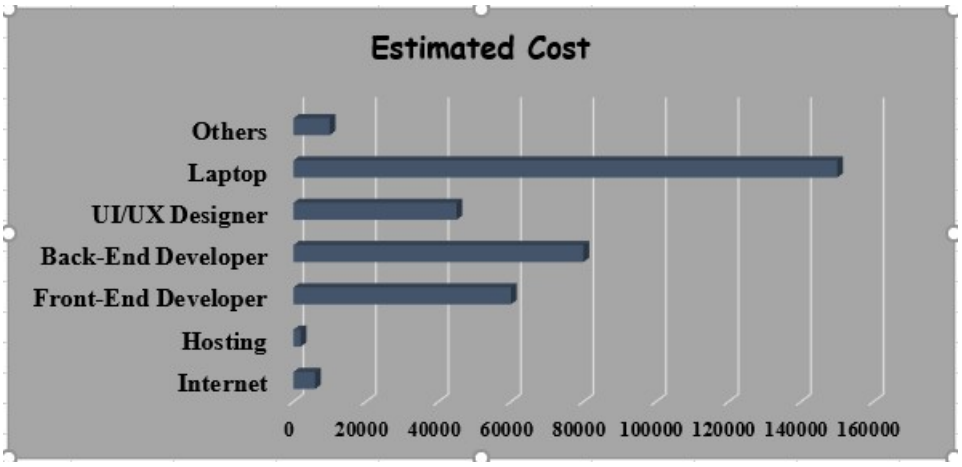

Figure 3.7: Cost Estimation Chart

Chapter 4

Methodology

A methodology is a systematic approach that is used to improve the credibility of a solution. It involves making the process visible and systematic, and it is typically used to explain how a web application was created. This information can be useful for readers who want to determine whether the methodology is reliable and accurate, and it can help to increase their confidence in the results. Using a reasonable technique is an important part of this process, as it helps to ensure that the methodology is credible and trustworthy.

4.1 Software Development Process

A solid methodology is essential for any software project, as it helps to guide the team in addressing the client's business objectives in detail and ensures that the final product is feature-rich. It also facilitates effective communication and execution of the software development process, helping both parties to work efficiently and meet deadlines. While there is no one-size-fits-all approach that all IT companies follow, most software design methodologies include a few fundamental phases such as gathering stakeholders' needs, creating a strategy, designing the product, innovating, testing, and delivering to clients. These are the core foundations of all software development methodologies and are critical for ensuring the success of a project.

Agile Methodology: As an intern at AlterSense Limited, I learned about the Agile methodology that the team follows for project development. This approach involves breaking the project down into smaller, iterative cycles that are constantly revised and modified based on the client's preferences. This approach promotes continuous communication between the development team and the client, and the main goals of each iteration include adding new features, integrating APIs, configuring protocols, and bringing the solution into compliance with industry standards. This method helps the development team to clear backlogs and deliver a better version of the solution at the end of each

iteration.

The MERN stack (MongoDB, Express, React, and Node.js) will be used to develop the web application for this project. Node.js is a runtime JavaScript environment that can be used to build server-side applications outside of a web browser, and MongoDB is a NoSQL database that stores data in JSON-formatted documents and can be easily distributed across multiple devices. Express is a routing library for Node.js that makes it easy to perform CRUD operations using various HTTP requests. React is a JavaScript library for building user interfaces for client-side applications, and it is fast and efficient thanks to its virtual DOM and has a large community of users. Various libraries such as React-dom and React-router-dom can be used to further enhance the front-end development of the application.

Chapter 5

Body of the Project

The body of the project serves as the main content of the report and it should be comprehensive in terms of the details of the work being done. It should include clear explanations of what needs to be done, how it should be accomplished, and what the expected outcomes are. The problem or issue that is being addressed should be clearly defined, and the approach to solving it should be outlined. This includes providing background information on the problem, describing the current situation, and presenting the reasoning behind the proposed solution. The methods used to collect and analyze data should be clearly described, as well as the way in which the results will be presented. It's also important to include conclusions and recommendations that can be drawn from the work. Overall, the body of the project should be well-organized, informative, and should present the information in a clear and concise manner.

5.1 Work Description

The proposed e-commerce platform aims to provide a seamless and user-friendly experience for customers. It offers features such as user registration and login to enable customers to create an account and manage their orders. The system administrator will have the ability to manage product categories and make updates to the catalog as needed. Customers will be able to browse through top-rated products, view detailed information about specific items, and add them to their shopping cart for purchase. After checkout, customers will be guided to a payment interface where they can complete their transaction securely through online payments. This comprehensive set of features aims to make the shopping experience as easy and convenient as possible for customers. The options on the site will be as follows:

1. **User registration and login:** This section will be accessed by either clicking on the Login option or by clicking on Register/Sign-up on the main homepage.

Customers will provide details such as name, email and password to register on the website or provide email and password if already registered.

2. **User profile with orders:** This feature improves the overall customer experience by providing them with easy access to their purchase history and account information, and allows them to quickly and easily manage their account information.

3. **Category Page:** Customers the ability to browse through various product categories in an organized and user-friendly manner. Additionally, customers have the option to search for specific products using a search function that operates similar to a Google search engine, providing them with the ability to find products in a swift and efficient manner. This feature enables customers to quickly and easily find the products they are looking for and can improve their overall shopping experience, by reducing the effort and time to find their desired products.

4. **Placing an Order:** This section of the e-commerce platform provides customers with the ability to select and purchase the items they desire. The process begins with customers adding their preferred items to a virtual shopping cart. This allows customers to review their selections, make changes if needed, and proceed to the next step of the purchasing process. Upon proceeding to checkout, customers will be prompted to provide their shipping and billing information, review their order, and complete the transaction. This feature streamlines the shopping experience and makes it easy for customers to purchase the items they are interested in.

5. **Shopping Cart:** An efficient and user-friendly shopping cart for providing customers with a positive and seamless shopping experience. A well-designed shopping cart which is easy to navigate and use, allowing customers to easily add, update, and remove items. Additionally, the cart should be visually appealing, making it easy for customers to track their progress as they shop.

6. **Payment processing:** After reviewing their selections and making any necessary changes, customers can proceed to the payment stage of the process. During this stage, customers will be guided to a payment interface where they can complete their transaction through online payments. This feature streamlines the purchasing process and provides customers with a convenient and secure way to complete their transaction.

7. **Product reviews and ratings:** This feature enables customers to share their experience about their purchased product, and help other customers to make a decision about the product. By allowing customers to view and submit reviews and ratings for products, this feature enhances the transparency of a product and ensures customers can make an informed decision based on the experience of other

customers. This feature also can enhance the credibility of the e-commerce platform and build customer trust in the platform, by providing them with unbiased feedback of the purchased product.

8. **Admin Panel:** Website's admin panel enables administrators with the tools necessary to effectively manage and maintain the platform. One of the key features of the admin panel is the ability to manage user profiles and orders. Administrators can view and manage customer orders, and also view details of each order. Additionally, the admin panel includes a product management feature that allows administrators to add, update and remove products from the platform. Another important feature is the user management feature, which allows administrators to create, edit and manage user profiles and take appropriate actions such as deleting accounts when required. Furthermore, The admin panel includes a "mark as delivered" option, which allows administrators to mark orders as delivered to the customer. And lastly, the admin panel includes a feature that allows administrators to view an info-graphic of day wise sales, which can help them to make data-driven decisions for the business.

5.2 Requirement Analysis

The Requirement Analysis is an essential step in the development process, as it involves the research and visualization of a company's current systems and processes to identify the needs and requirements for a new system. This is accomplished by utilizing industry-standard tools, methodologies, and best practices. To gain a comprehensive understanding of the system requirements, interviews are conducted with various user groups and stakeholders to determine their specific needs in terms of database capabilities, data handling, and frequently performed activities. The analysis also captures information on the interactions between different stakeholders and their respective roles in the system. To make the process easily understood by all stakeholders, the business processes are analyzed using simple notations and symbols, providing a clear and concise representation of how the system functions. This process ensures that the final solution will meet the needs and requirements of all stakeholders, making the process more efficient and effective for the company.

5.2.1 Rich Picture

Rich pictures are modelled using diagrams and illustrated graphically which has the main elements and relationship they have between them according to the business system in place. A complete rich picture could be of significance to other stakeholders of the problems in an existing system and permit them to apprehend many different facets of

the situation. Both the structure and the processes of a given situation are focused on Rich Picture.

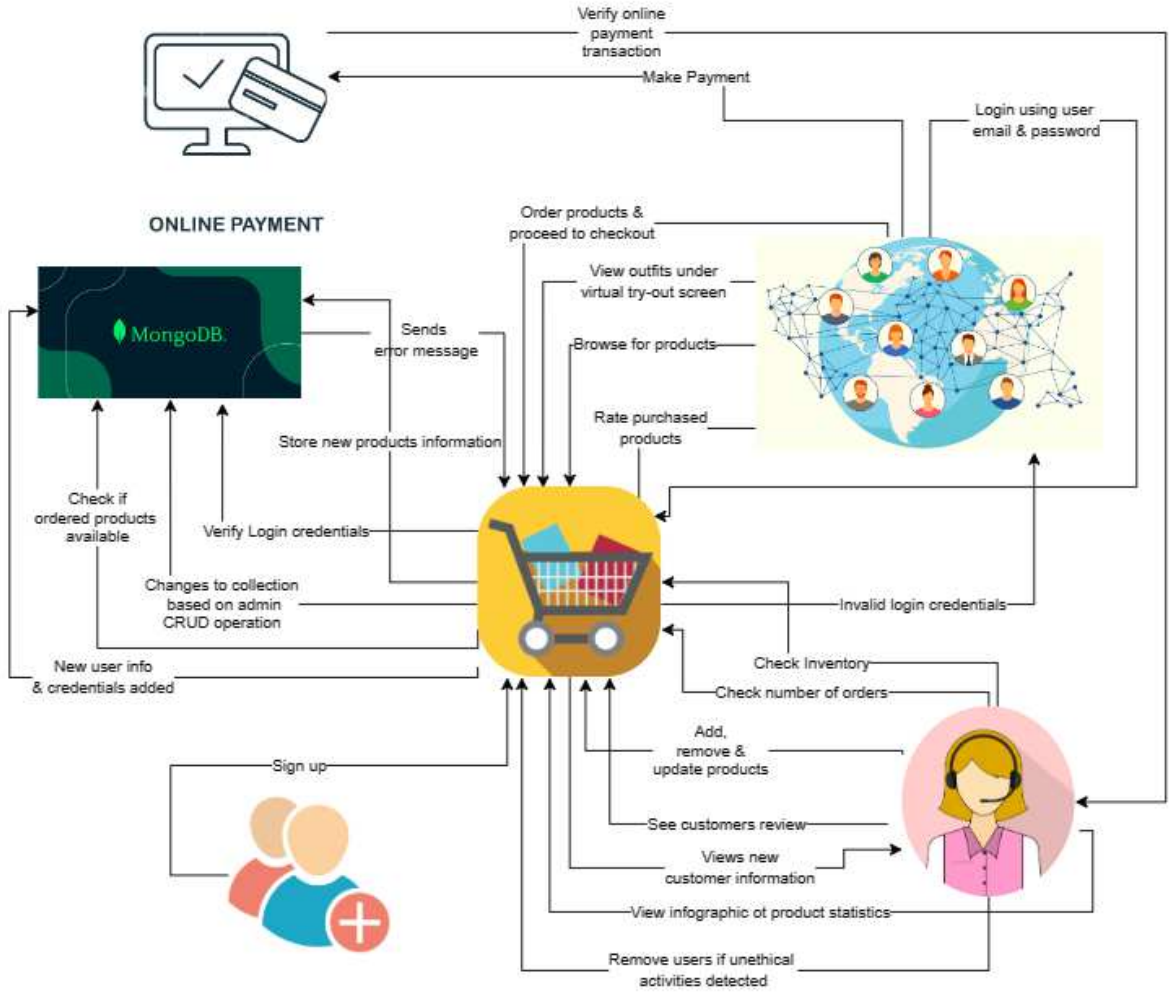

Figure 5.1: Rich Picture

5.2.2 Functional and Non-Functional Requirements

Functional Requirement

Table 5.1: Functional Requirement- User registration and login

Name of the Function: User registration and login			
Input:	**Process:**	**Output:**	**Priority:**
1. Username 2. Email 3. Password	1. User will click on "Sign up" option in navigation bar. 2. Enter the required credentials. 3. Click Sign Up thus saving user details in database.	Users will be directed to category page where they will browse products as well as place orders.	High
Precondition: • Users should have proper access to the system. • Must have internet connection.			
Post condition: • System will send the input detail to database. • System will direct user to login page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not accurate, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

Table 5.2: Functional Requirement- User profile with orders

Name of the Function: User profile with orders			
Input:	**Process:**	**Output:**	**Priority:**
1. Email 2. Password	1. User will log into the website. 2. Enter the required authenticated credentials. 3. Select and click on "Profile" in the nav-bar. 4. Change user-info and/or view order details.	User will be directed to profile page as well as they will be able to view order details as well as update their profile information.	High
Precondition: • Users should have proper access to the system. • Must have internet connection.			
Post condition: • System will send the input detail to database for authentication. • System will direct user to profile page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticate, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message.			

Table 5.3: Functional Requirement- Place an order

Name of the Function: Place an order			
Input:	**Process:**	**Output:**	**Priority:**
1. Email 2. Password	1. User will Log in the website. 2. Enter the required authenticated credentials. 3. Select the product and click "Add to cart". 4. Proceed to checkout.	Order will be placed and user will be directed back to system home page.	High
Precondition: • Users should have proper access to the system. • Must have internet connection.			
Post condition: • System will send the input detail to database for authentication. • System will direct user to category page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticate, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message. • If no selected product count exceeds the system will generate an error message.			

Table 5.4: Functional Requirement- Make Online Payment

Name of the Function: Make Online Payment			
Input:	**Process:**	**Output:**	**Priority:**
1. Email 2. Password	1. User will Log in the website. 2. Enter the required authenticated credentials. 3. Proceed to checkout after adding items to cart. 4. Select payment type method. 5.Click "Place Order" to confirm purchase.	After successfully placing their desired order user will be directed back to system home page.	High
Precondition: • Users should have proper access to the system. • Must have internet connection. • For online payment user must have a proper bank account.			
Post condition: • System will send the login input details to database for authentication. • System will display a message showing payment successful. • System will direct user to category page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticate, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the input fields, the system will generate an error message. • If online payment is not successful the system will generate an error message.			

Table 5.5: Functional Requirement- Product reviews and ratings

Name of the Function: Product reviews and ratings			
Input:	**Process:**	**Output:**	**Priority:**
1. Email 2. Password	1. User will Log in the website. 2. Enter the required authenticated credentials. 3.User will go review section of a purchased product. 4. User will rate and comment on quality of the product. 5. Click on "Submit" to upload their reviews.	Review will be posted following which they will see a "Thank for the review" message generated by system.	High
Precondition: • User should have proper access and detail idea about the system . • Must have internet connection. • User can only review the products they have purchased.			
Post condition: • System will send the login input details to database for authentication. • System will make changes to database based on admin selection. • System will direct user to category page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticate, the system will respond with an error message. • If the input is not valid the system will generate an error message. • If no data is given for the product input fields, the system will generate an error message.			

Table 5.6: Functional Requirement- Admin Panel

Name of the Function: Admin Panel			
Input:	**Process:**	**Output:**	**Priority:**
1. Admin Username 2. Password	1. Admin will Log in the website. 2. Enter the required authenticated credentials. 3.Check new user info. 4. See customer review. 5. Add, update or remove products. 6. Remove users based on unethical activity (if any). 7. Mark delivered orders. 8. View product statistics details.	Each of the changes as performed by the admin will be executed as well as reflected in the database including the website, then the admin will be directed back to former page.	High
Precondition: • Admin should have proper access and detail idea about the system . • Must have internet connection.			
Post condition: • System will send the login input details to database for authentication. • System will make changes to database based on admin selection. • System will direct admin to category page. • System should be able to provide accurate data based on the query			
Alternate Options: • If the credentials are not authenticate, the system will respond with an error message. • If the inputs are not valid the system will generate an error message. • If no data is given for the product input fields, the system will generate an error message.			

Non-Functional Requirement

1. **Performance:**The speed at which an application responds to user input, known as its performance, is a crucial aspect of its overall functionality. This can be influenced by a variety of factors, including system efficiency and the workload being placed on the application. In order to provide optimal user experience, it is important to ensure that website load times remain within an acceptable range, ideally taking no longer than a single or two seconds to load. Additionally, in order to promote seamless navigation, the application should be designed in a way that allows users to be immediately directed to their requested view upon clicking on an option.

2. **Scalability:** The ability of the application to handle an increasing workload and handle concurrent users, to ensure it can support predicted growth over several years.

3. **Portability:** The system is designed to work on all major operating systems including Windows, Linux, MacOS, iOS, and it can be accessed through any web browser. The system is also designed to work on any new device that might be used in the future.

4. **Reliability:** The system is designed to operate without failure for a specified period of time under predetermined conditions.

5. **Availability:** The system must be accessible to users at all times, with a high percentage of uptime. Users can access and use the system at any time, day or night.

6. **Maintainability:** The ability to make changes to the system quickly and cost-effectively, including the ability to estimate the time and resources required to fix bugs, enhance performance, or adapt to changing conditions.

7. **Usability:** The system is designed with a user-friendly interface that allows users to easily complete the main functions of the system. The interface is designed to have conceptual integrity and be easy to navigate.

8. **Security:** The system is designed to protect all data within it from malware attacks and unauthorized access. Users are required to create an account to access the system, with personal profiles that are only accessible by the user themselves. Users are granted access by providing a username and password.

9. **Localization:** The system is designed to be in line with the context of the local market, including language, laws, currency, culture, spelling, and other relevant factors.

5.3 System Analysis

System analysis is a methodical approach to examining and understanding a system or its components with the goal of identifying any issues and determining how it can be improved. It involves gathering and evaluating data, breaking down the system into its various parts, and examining how they work together to achieve the system's objectives. The objective of the analysis is to understand the system's current state and how it can be improved to ensure that all its parts are functioning effectively and efficiently in fulfilling their intended purpose. The outcome of the analysis is a set of recommendations for the appropriate course of action to optimize the system.

5.3.1 Six Element Analysis

The Six Elements Analysis gives an understanding of how each element functions inside each process.

Table 5.7: Six Elements Analysis

Process	System Rules				
	Human	Computing hardware	Database	Software	Network and communication
User registration and login	*1. User 2. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*
User profile with orders	*1. User 2. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*
Place an order	*1. User 2. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*
Make Online Payment	*1. User 2. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*
Product reviews and ratings	*1. User 2. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*
Admin panel	*1. Admin*	*1. Computer/ Laptop 2. Printer 3. Networking devices- (Router, Switch, Bridge, Hub)*	*MongoDB*	*Web Browser e.g - (Chrome, Firefox, Microsoft Edge)*	*Internet*

5.3.2 Feasibility Analysis

A feasibility study is a process for evaluating the practicality and viability of a proposed project. It assesses the project's technical, operational, financial, and economic feasibility by analyzing metrics such as payback period, net present value, return on investment, and developmental period. Additionally, it examines the project's ability to fulfill user requirements and identify potential risks. The goal of the feasibility study is to determine whether the project is a viable option and if it should move forward to the next

phase of development. The study is conducted at the beginning of the project, before any significant resources are committed, and serves as an important tool for systems analysts to decide whether to proceed with a project or consider alternative approaches. It is a quick assessment that helps to determine whether a proposed project can be completed successfully, and it is done before any large expenses are incurred.

1. **Technical feasibility:** The aim of conducting a technical feasibility study is to evaluate the organization's capability to build the proposed system. This examination should encompass an examination of the development team's knowledge of the potential target software, operating systems, and hardware, as well as the system size, complexity, and the team's proficiency with similar systems. It is crucial in this stage to evaluate the potential risks involved in the project and to take steps to minimize them as early as possible in the project. This assessment will determine the potential impact that project may have on the organization and its stakeholders. It will also help the team to develop an implementation plan and an appropriate budget for the project. Here the developers have a high structure/ fixed set of requirements, and the project is a definite size, and also everyone are highly familiar with this kind of technology as well as they are quite experienced to this work. So, based on these there is a very low risk.

2. **Operational feasibility:** The operational feasibility of a project is a measure of its ability to effectively and efficiently solve problems, realize opportunities and meet the requirements established during the analysis phase. It also takes into account the availability and willingness of the organization's human resources to support the proposed system and the potential acceptance of the changes by the workforce. This assessment is crucial to ensure that the implemented and configured system will be utilized to its full potential and to evaluate the overall success of the project. It is a critical step in the system development process to evaluate the practicality and effectiveness of the proposed solution. This system offers a web-based portal. The system requires internet, and the interface of the proposed system is user friendly hence the users will not have any difficulty using this system. Additionally the users will not require any extra training to utilize this system, they will not have to devote time to learning it, as the proposed system fulfills all given requirements and will provide the users with the requested analysis.

3. **Economic feasibility:** Economic feasibility is a kind of cost-benefit analysis of this e-commerce project, which assesses whether it is possible to implement it. It consists of market research, economic research, technological research, and strategic research. To determine the financial advantages and expenditures connected with the development project, an economic feasibility assessment is performed.

4. **Schedule feasibility:** Schedule feasibility is the time within which all the functionalities of the project can be implemented. In this phase we focus on the development period vs any deadline as set by the client or the organization. We need to assign priorities based on must have, should have, could have depending on the scenarios to meet the development deadline of the project. In some cases when the client demands a high-quality system within a short time then we need to hire more resources which affects the economic feasibility and also put full concentration in developing this system. The proposed system has a target development period of 4-6 months.

5.3.3 Problem Solution Analysis

When creating an e-commerce website, it is essential to ensure that all information and products are presented in an organized and efficient manner. This requires careful planning, conceptualization and organization of all elements in order to effectively display the products and information to customers. This step is important to ensure that the website is user-friendly, easy to navigate, and provides customers with a seamless shopping experience. We can create software solutions through custom software development that are not possible in any other way. The abundance of options could, however, result in too complex systems with a lot of extraneous features. For example - for online retailers, abandoned shopping carts are a big concern. It can affect even the biggest e-commerce companies. E-commerce sales are lost as a result of abandoned carts. Customers were leaving the site mid-purchase because of the lengthy checkout process. This e-commerce issue cannot be underestimated. Thus, developing a new checkout layout is crucial for us so that it enables a more simpler two-step procedure. However, understanding and fulfilling a client's requirements, some of which are incredibly simple and others which are incredibly complex, is one of the most challenging tasks that any developer faces when working on a software development project. In such situations, priorities need to be set in order for us to have a better analysis and ensure the best user experience.

5.3.4 Effect and Constraints Analysis

Before implementing a change in the deployed product, effect analysis is the process of assessing, projecting, and estimating the prospective results, focusing on unanticipated side effects of a decision or modification in a system and outlining possibly affected regions. It helps us address possible issues before they occur by letting us know which aspect of the system might be unintentionally impacted by a change. Doing a software effect analysis has the purpose of guiding a developer in concentrating on those areas that are effected by a change or those activities that may be urgent and require immediate corrections due to modifications such as when a system or set of requirements needs

improving, it is carried out. Ignoring this analysis— that is, the likely results and unforeseen behaviors of a prospective modification in just one module can have a detrimental effect on the proper operation of the entire system. It may result in problems with the software's cost and time estimates, as well as with the quality, history, and dependencies between the module that needs the change and other modules.

Identification and elimination of roadblocks are processes based on the notion of constraints. This is important since a strong application often boosts production capacity. Some of the frequent constraints that are faced during a project development phases are:

- **Time:** The project's timeline for completion, including the deadlines for each stage and the date on which the final deliverable will be made available.
- **Cost:** The financial and resource-related expenses necessary to complete the project on schedule and within the specified range.
- **Scope:** Defines constraints such as project goals, deliverable, features, and functionalities, as well as the work necessary to accomplish the project modules.

5.4 System Design

A method employed by firms to make and maintain systems that perform basic business functions. The main goal is to boost worker potency by applying computer code solutions to key business tasks. A structured approach should be utilized in order to ensure success.

5.4.1 UML Diagrams

UML, or Unified Modeling Language, is a widely accepted modeling language that includes a set of diagrams that help software developers in specifying, visualizing, constructing and documenting the components of software systems, as well as other non-software systems. This language is based on a collection of industry best practices that have been proven successful in the modeling of large and complex systems. The UML utilizes graphical notations to demonstrate the design of software projects. Using UML helps project teams to communicate effectively, investigate design options, and evaluate the architectural layout of the software, making the development process more efficient and effective.

Use case diagrams

Use cases are an effective way to capture functional requirements of a system. They describe how the system interacts with users and its behavior in different scenarios. A

use case model is a representation of a system, which consists of use cases, actors and their interactions.

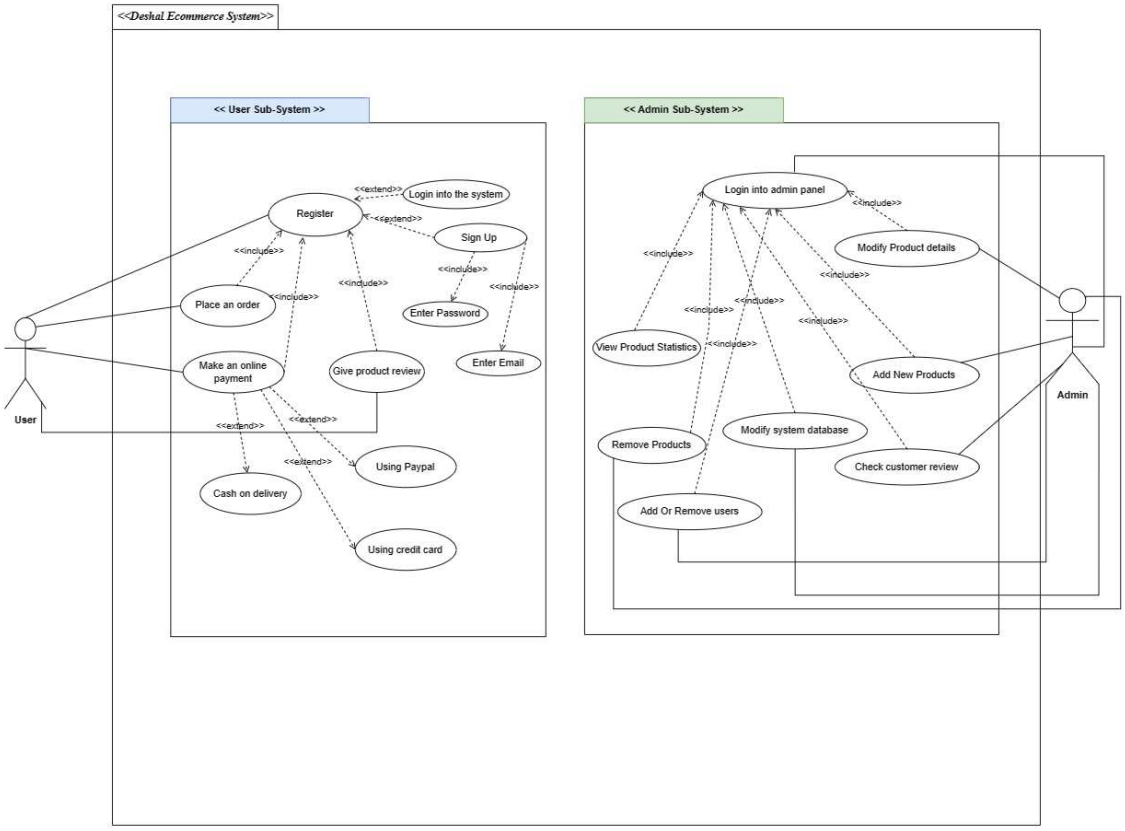

Figure 5.2: Use Cases With Subsystems And Boundary

Activity diagram

An activity diagram is a graphical representation of the functional capabilities of a system, as described by the use cases. It illustrates the logic of an operation by modeling complex processes in a high-level diagram, making it easier to understand the different steps involved. It provides a clear view of the life-cycle of a process and can be used to identify candidate use cases by analyzing business workflow. It is a useful tool for understanding the system's practicality and the flow of activities that make up the system.

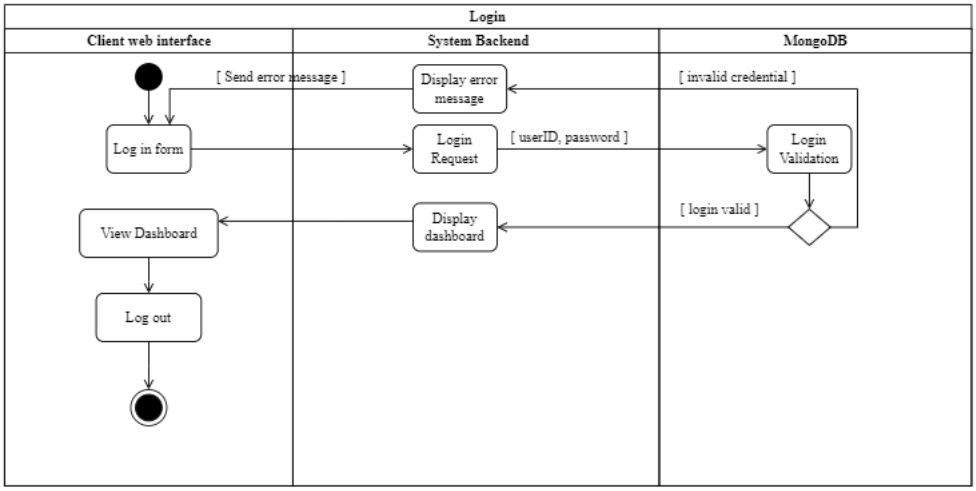

Figure 5.3: Login to The System

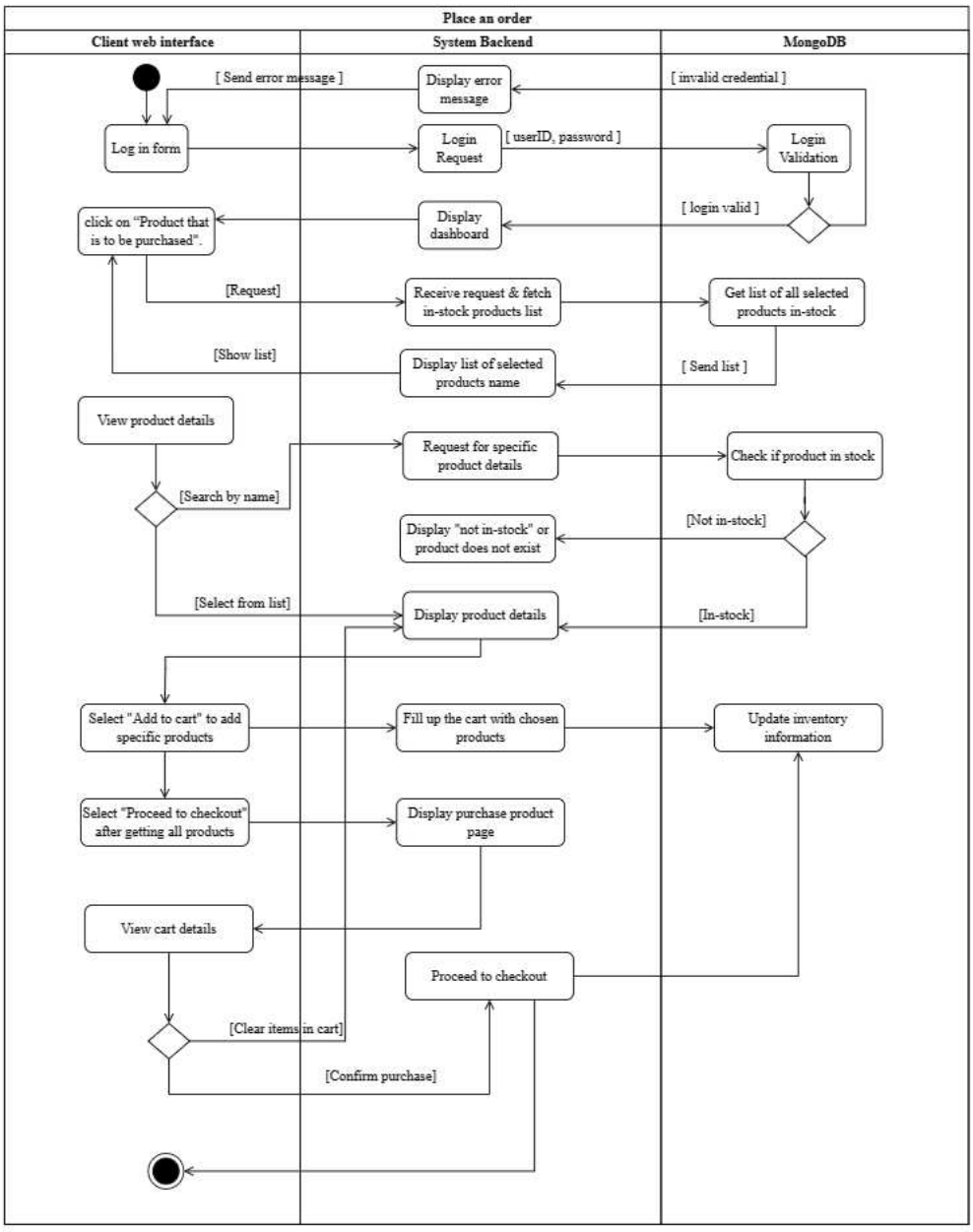

Figure 5.4: Place an order

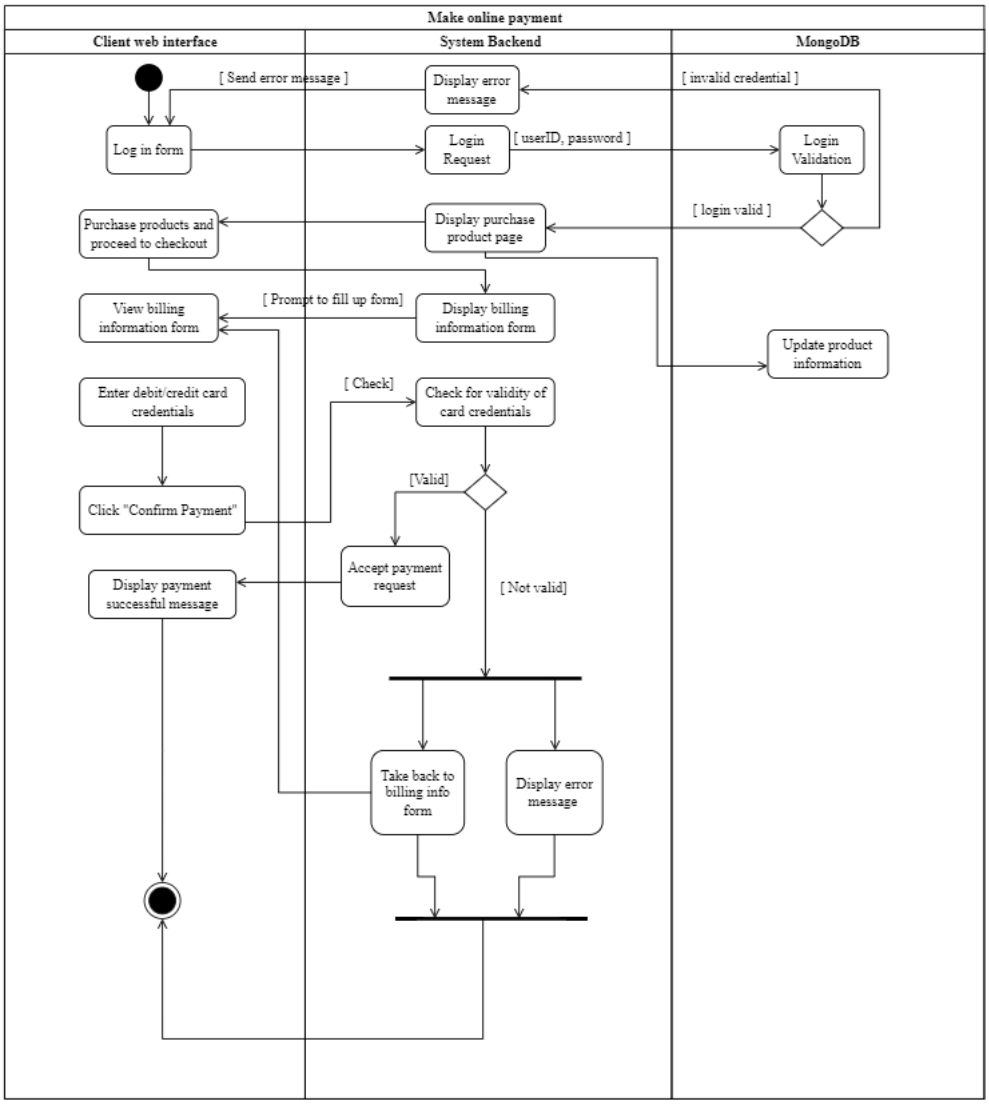

Figure 5.5: Make online payment

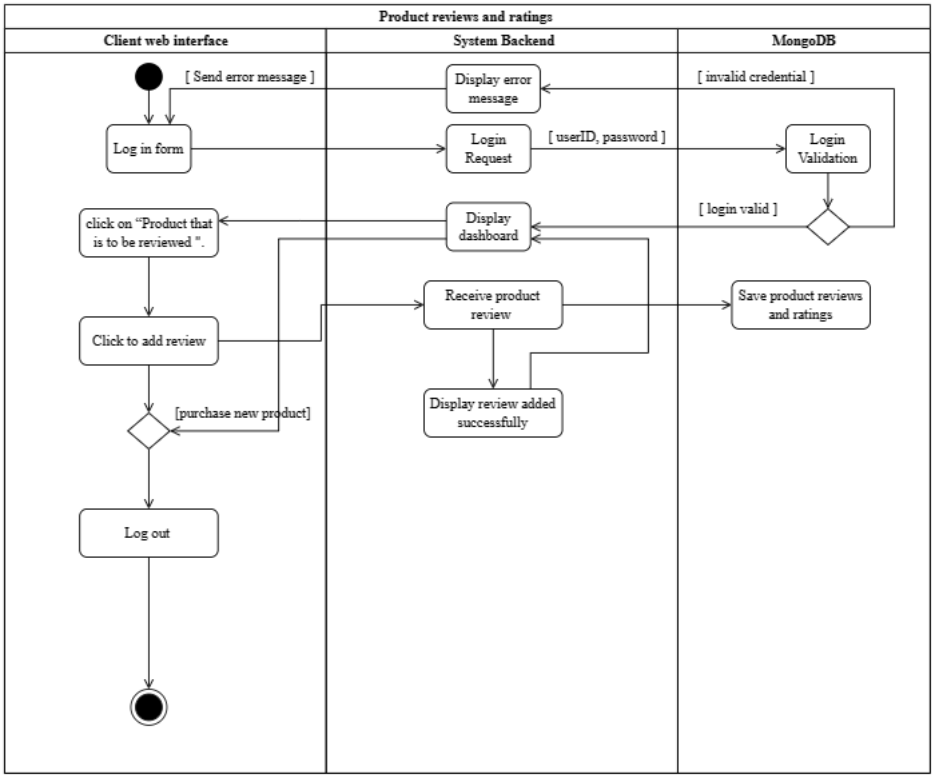

Figure 5.6: Customer review

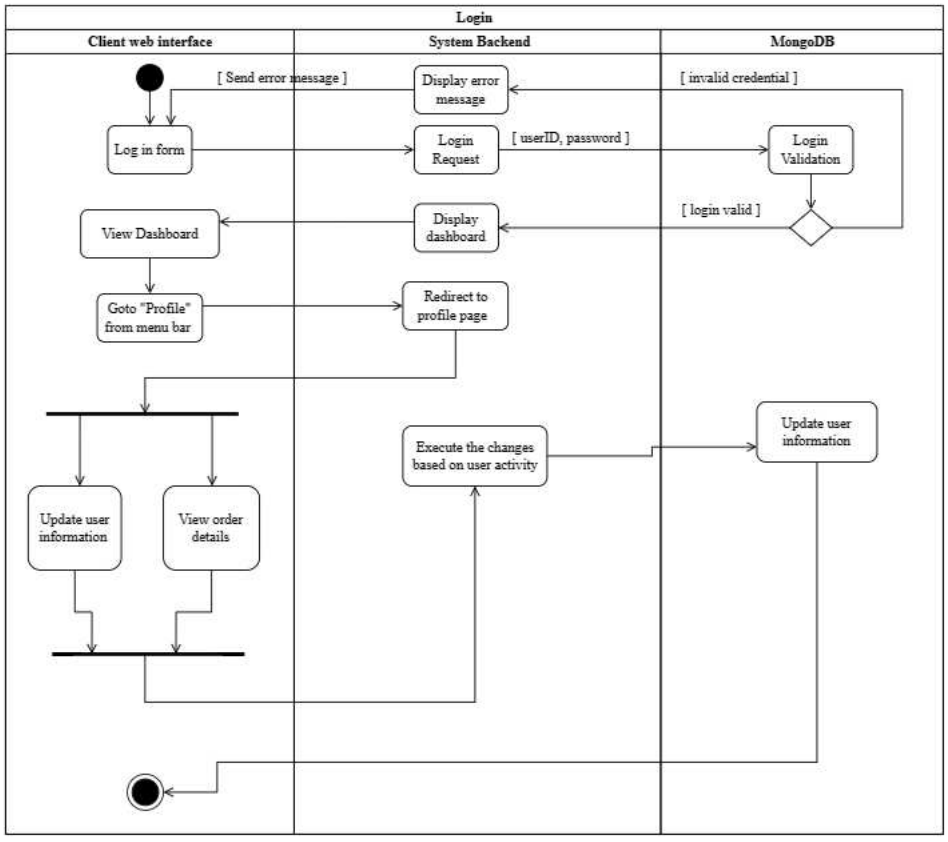

Figure 5.7: User profile with orders

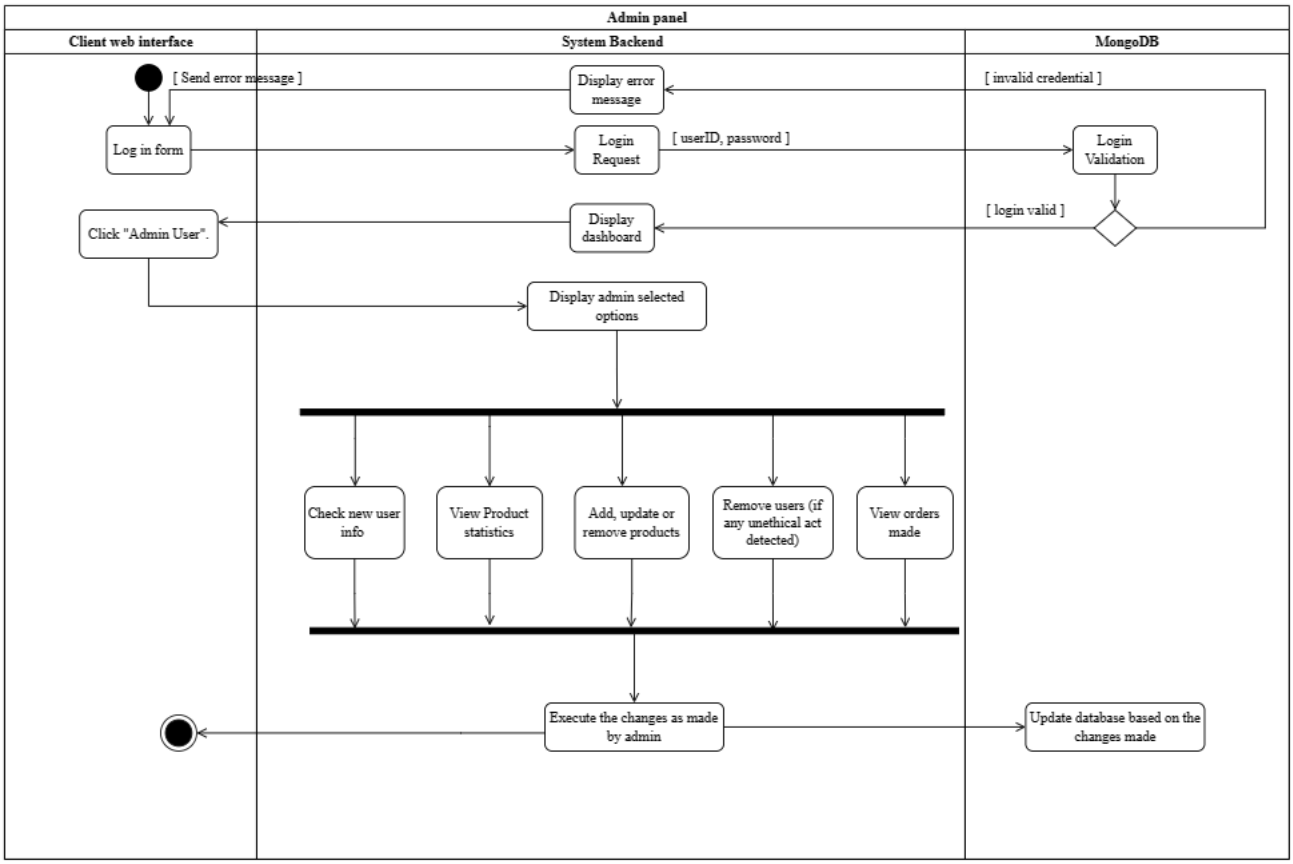

Figure 5.8: Admin panel

Architecture

MERN is a full-stack JavaScript framework that follows the traditional three-tier architectural pattern. It is composed of four technologies, Reactjs for the front-end display tier, Expressjs and Nodejs for the application tier, and MongoDB for the database tier. This architectural approach makes it easy to build a three-tier architecture (front-end, back-end, and database) using only JavaScript and JSON. With MERN, developers can easily build web applications that support CRUD operations, handle server-side routing, and handle data storage.

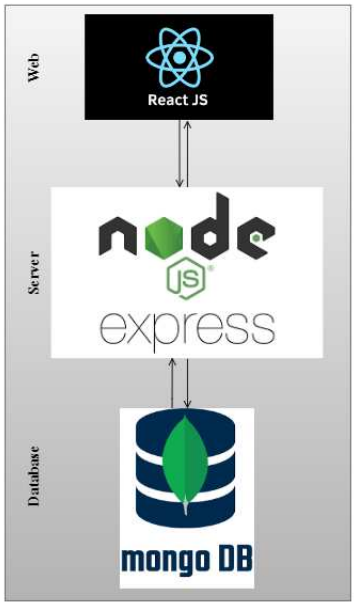

Figure 5.9: System Architecture for E-commerce platform

5.5 Product features

Product features are the characteristics or properties that a product possesses that make it valuable to consumers and distinguish it from similar products in the market. In the context of software, a product feature can refer to any of its functionalities, capabilities, or visual elements. The defining characteristic of a product feature should be its ability to provide value or benefit to the user. Product feature helps to understand the advantages of the product over its competitors, it also helps to identify the user's needs that can be met by the product. It plays a vital role in differentiating a product from its competitors, and it's an important aspect to consider when developing a product. They help to create an image of the product in the minds of potential customers and can influence their purchasing decisions. In short, Product features are critical in providing value to the end-users and in making the product stand out from the competition.

Input

The following table represents the data type inputs for the e-commerce website :

Input for Ecommerce website	
Process	Field Data Type
User registration and login	Email - *String* Password - *String*

Place an order	Email - *String*
	Password - *String*
	Address - {
	city - *String*
	country - *String*
	postal code -*int*
	road no. - *int*
	}

Make online payment	Email - *String* Password - *String* Card Detail - *String*
User profile with orders	Email - *String* Password - *String*
Product reviews and ratings	Email - *String* Password - *String* Ratings - *int* Review - *String*
Admin panel	Email - *String* Password - *String*

Figure 5.10: Input for E-commerce website

Output

The following table represents the expected output type for the e-commerce website :

Output for Ecommerce website	
Process	Output Type
User registration and login	**If** successful - redirect user to product category page. **Else** - Display error message - "Invalid Authentication" / "Failed to validate user"
Place an order	**If** item is in stock - successfully item added to cart. **Else** - Display "Out of stock" **If**- Shipping address all fields entered successfully proceed to checkout. **Else** - Display message - "Please fill out the fields"
Make online payment	**If** - Online payment details entered successfully- "Payment Successful" **Else** - Display - "Invalid credentials"
Product reviews and ratings	**If** - Data input for rating and review fields entered - "Review added successfully" **Else** - Display error message -"Failed to add review"
User profile with orders	**If** - Data input for updating user fields correct - "Updated successfully" **Else** - Display error message -"Failed to update user info"
Admin panel	**If** successful - redirect user to product category page. **Else** - Display error message - "Invalid Authentication"

Figure 5.11: Outputs for E-commerce website

Chapter 6

Results & Analysis

The technical aspect of performance tests is result and its analysis. These techniques are employed by software testers to enhance optimization for the current results. The tests must run for a predetermined amount of time, it must be decided so that there are no errors, and other crucial concepts must also be understood. During the performance testing services, they must pinpoint the performance lows and highs. Testers may utilize filter choices to remove any kind of tests that are not necessary. They examine a system's non-functional requirements as to ensure that it will not perform worse as more individuals use it. All of these testing efforts are conducted to guarantee the delivery of a high-performance application.

The assessments are still under progress. However, a brief quantity of testing with only the most fundamental criteria were done, and it is now fully working. Real-time user testing is still waiting, though. The test cases that were carried out were noted, and several issues with regard to non-functional needs were also found as well as noted. The testing technique was utilized to support the fundamental test cases that were tested. Once the hosting is operational, user testing along with everything will be done once again. As a result, other adjustments likely to occur when testing proceeds further.

6.1 Software Testing

Software testing is a technique for ensuring that a software product is free of bugs and that it really complies with the client's expectations. It comprises the manual or automatic execution of software and its system components in order to assess one or more significant functionalities. Software testings' goal is to detect issues, gaps, or incomplete requirements compared to the requirements as specified. The number of active users, activities, and clicks per second are some of the most crucial performance testing variables. It is essential to pay close attention to these factors as well as how the application behaves in relation to a predetermined workload. The tests must be carried out correctly in order

for the results to be collected in one source. After the tests are finally completed, it's crucial to compile the findings and continue the result analysis.

I have included an illustration below of those tests that were conducted on requirements that fully satisfy those given by the clients:

Admin Panel						
Test Cases	**Name**	**Description**	**Execution Steps**	**Expected Outcome**	**Actual Outcome**	**Pass /Fail**
TC1	Inventory Management	Inventory database is managed where products are added, updated & deleted and the stock information is checked.	1. Admin will log into the system 2. From the top tight corner of the navigation bar click on the dropdown menu. 3. From the dropdown menu options select "Products". 4. The admin will be directed to product list page. 5. In order to update click on the edit icon, if new product is to be added click on "create product", for deletion click on delete icon.	Admin must be able to easily create, update and deleted products, where the changes will be reflected in database and system application.	Product can be successfully created, updated and deleted and these changes are reflected in database and system application.	Pass
TC2	Order Management	Order details are checked such as delivery is successful or not, marking orders as delivered.	1. Admin will log into the system 2. From the top tight corner of the navigation bar click on the dropdown menu. 3. From the dropdown menu options select "Order". 4. The admin will be directed to order list page. 5. To view order information click on "Details".	Admin must be able to view order details, marking paid orders as delivered where the changes will be reflected in database and system application.	Order details can be viewed, where the changes will be reflected in database and system application. Due to dependency on online payment method marking the order as delivered is still pending.	Pass
TC3	User management	Performing CRUD operations on site users and assigning administration roles to system managers.	1. Admin will log into the system 2. From the top tight corner of the navigation bar click on the dropdown menu. 3. From the dropdown menu options select "Users". 4. The admin will be directed to Users list page. 5. In order to update click on the edit icon, for deletion click on delete icon. If administration role is to be assigned, click "is Admin" checkbox.	Admin must be able to easily create, update and deleted users, where the changes will be reflected in database and system application.	Users can be successfully created, updated and deleted and these changes are reflected in database and system application.	Pass
TC4	Product Statistics	Checking infographic details on total orders/day, rating/products.	1. Admin will log into the system 2. From the top tight corner of the navigation bar click on the dropdown menu. 3. From the dropdown menu options select "Product Statistics". 4. The admin will be directed where the infographic details will be seen.	Admin must be able to view the orders made per day and total ratings of each brand, where the changes in database and system application will be reflected in the following infographics.	The orders made per day and total ratings of each brand can be viewed, where the changes in database and system application are reflected in the following infographics.	Pass

Figure 6.1: Testing cases for Admin

User						
Test Cases	Name	Description	Execution Steps	Expected Outcome	Actual Outcome	Pass /Fail
TC1	User Log in	User requires to log into the system to be able to order products as well as view order details.	1.User will click "Sign in", redirected to sign in page. 2. Enter the required credentials. 3. Click on "Log In".	User is an authenticated member of the system, as well as the credentials are correct then they will be logged into the system.	Credentials validation along with user verification is successful.	Pass
TC2	Registration	User is new to the system and wants to order products, then they will require to register into the system.	1.User will click "Sign in", redirected to sign in page. 2. Click "register". 3. Enter the required information. 4. Click on "Register".	New user details will be stored into the database. and they will be able to log into the system.	User registration is successful with all information stored into the database.	Pass
TC3	Search for products	User should be able to search for desired products.	1.User will input the product name they want to see. 2. Click on "SEARCH".	System will check if the searched item present in database.	System displays the searched item fetching from database.	Pass
TC4	Display Cart information	User should be able to see items they added to their cart.	1.User will click on "Cart" icon and will be redirected from where they left off.	System will keep a track of the items initially added to cart.	System successfully keeps a track of the items initially added to cart.	Pass
TC5	Checkout process	User should be able undergo a complete checkout process to order the desired product.	1.User will click on "Cart" icon and will be redirected from where they left off. 2. Click on "Proceed to checkout". 3. Choose from the following payment options. 4. Click on "Continue" 5. After checking the ordered details click on "Place order" to confirm order.	System will guide through the coded steps based on authenticated credentials.	The changes will be reflected in database and system application. Due to dependency on online payment method marking the order as delivered is still pending.	Pass

Figure 6.2: Testing cases for Customers

6.2 Graphical User Interface Result

The development of Graphical User Interfaces (GUIs) has greatly increased the ease of use for computer and digital technologies for people with little technical expertise. These interfaces are designed to be user-friendly, with the goal of making them accessible to a wide range of users. The focus of GUI is on the user experience rather than the machine, making the interaction more intuitive. For example, when a user accesses a movie from a streaming video player on a website, they will interact with multiple interfaces, like operating system, browser, website, and video player, all designed to be user-centered. Thus, it makes it more comfortable for people of all skill levels to navigate and use digital technologies.

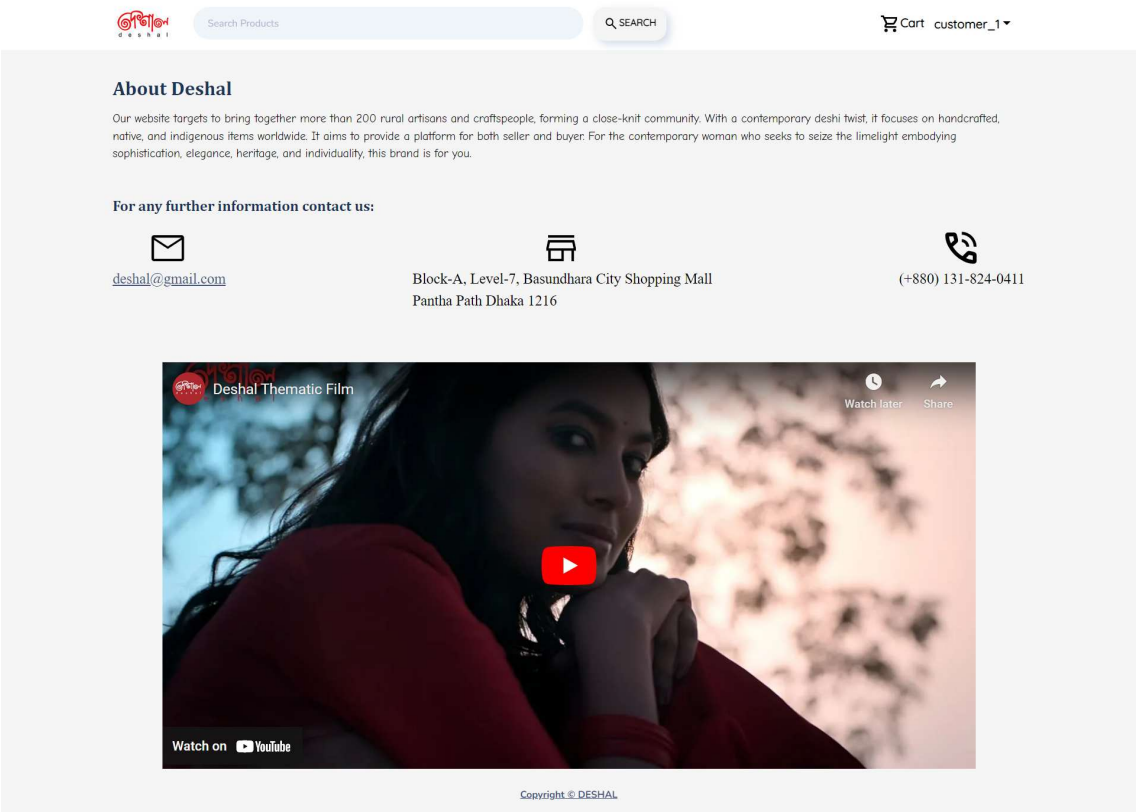

Figure 6.3: About page of Deshal

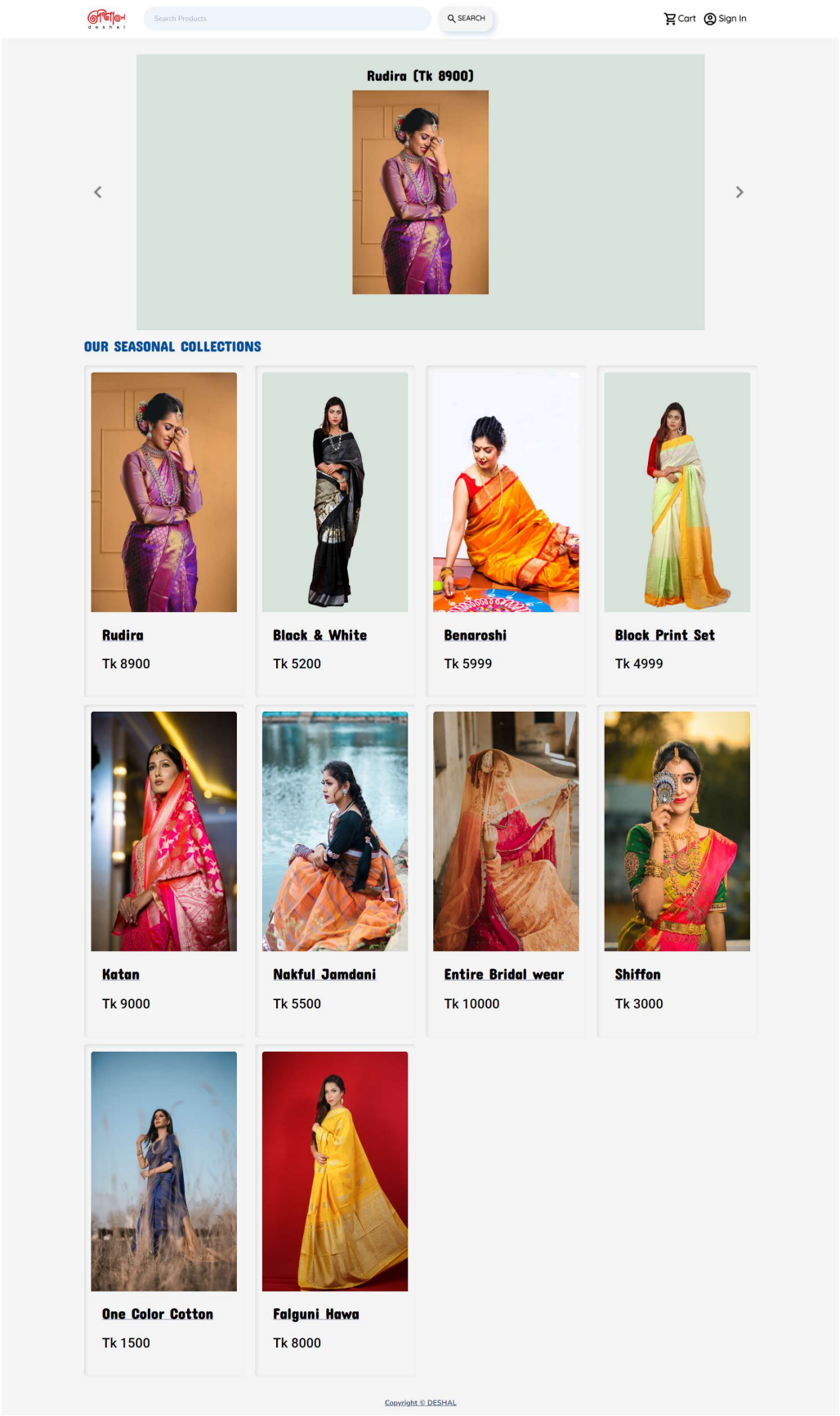

Figure 6.4: Landing page of Deshal

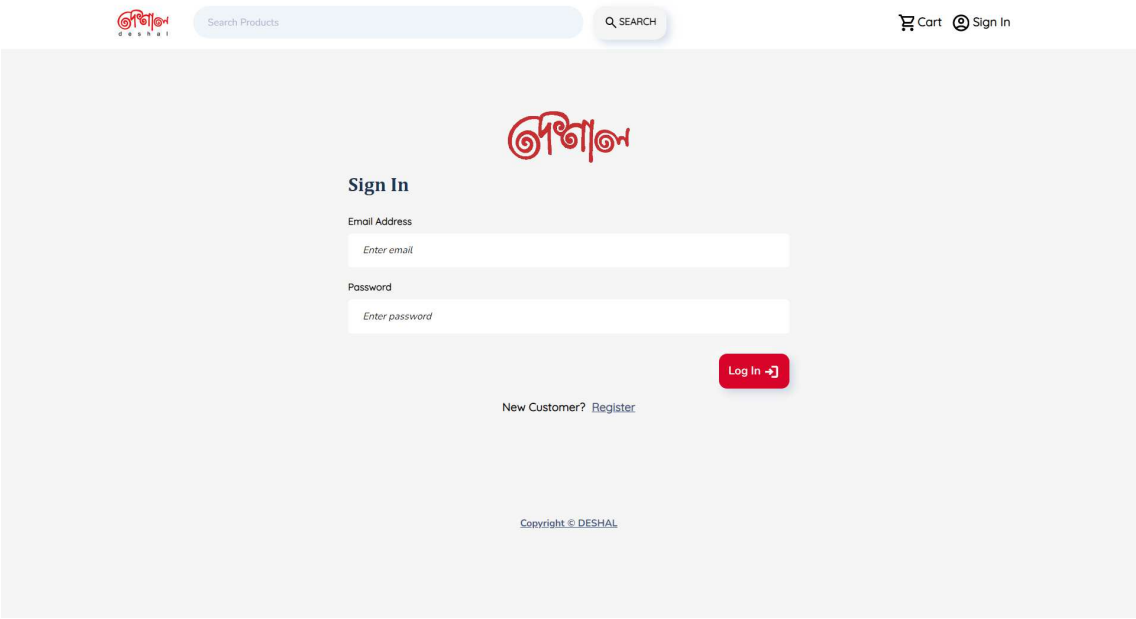

Figure 6.5: User sign-in page of Deshal

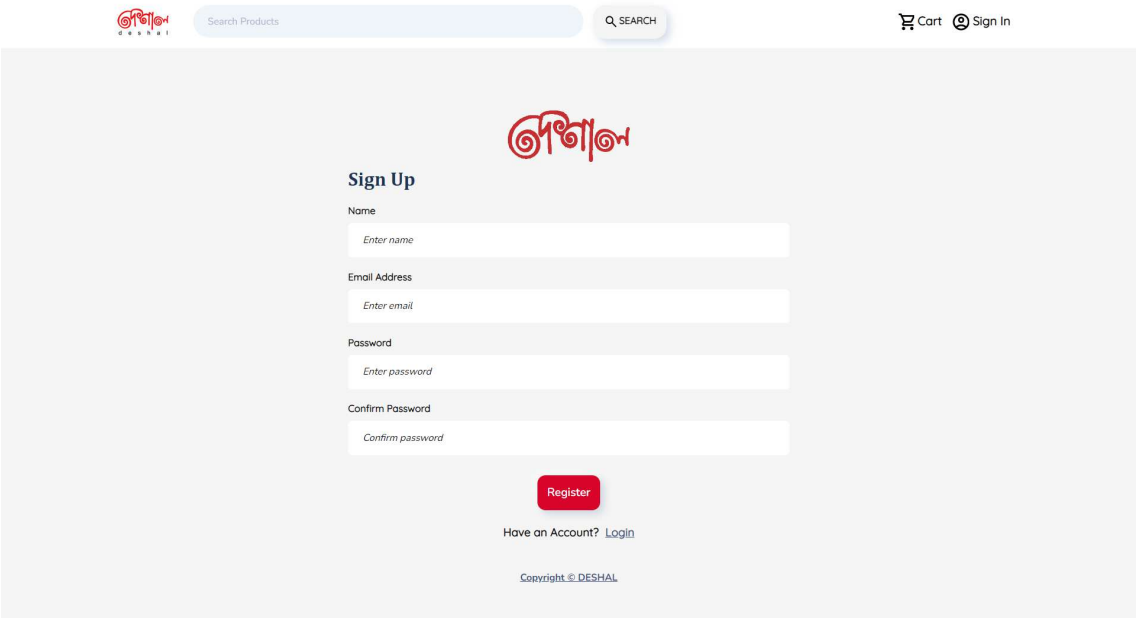

Figure 6.6: User register page of Deshal

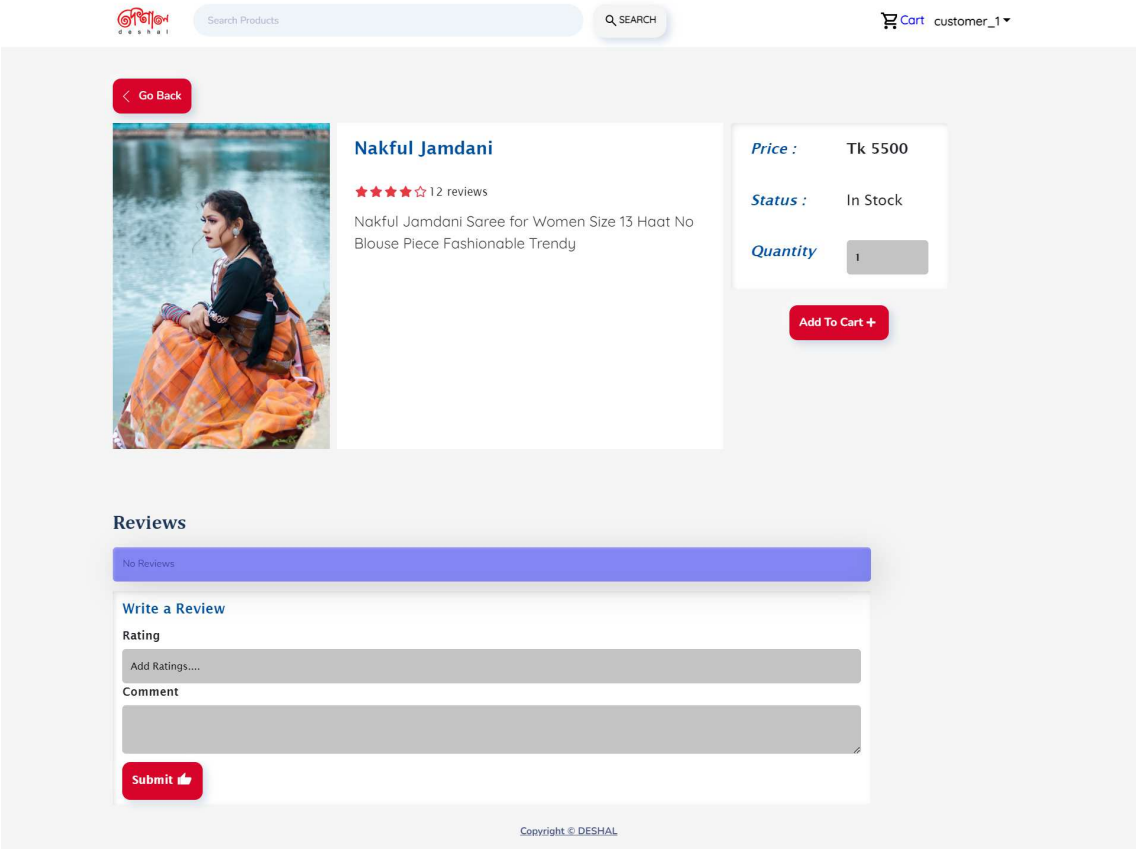

Figure 6.7: Deshal Product Information with customer review page including add to cart option

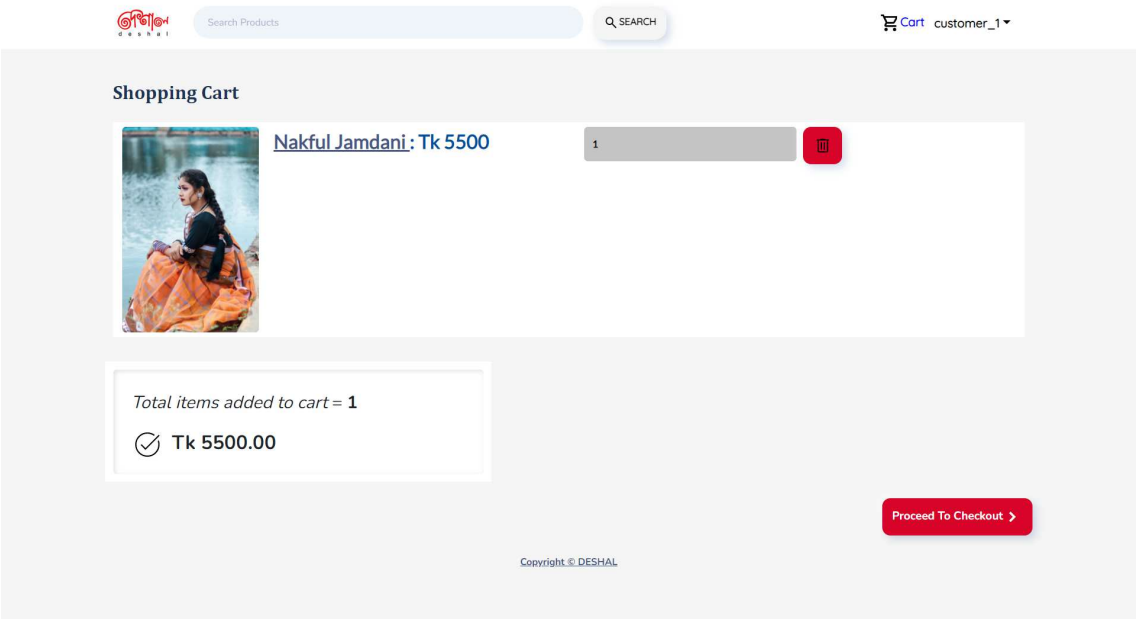

Figure 6.8: Deshal user shopping cart

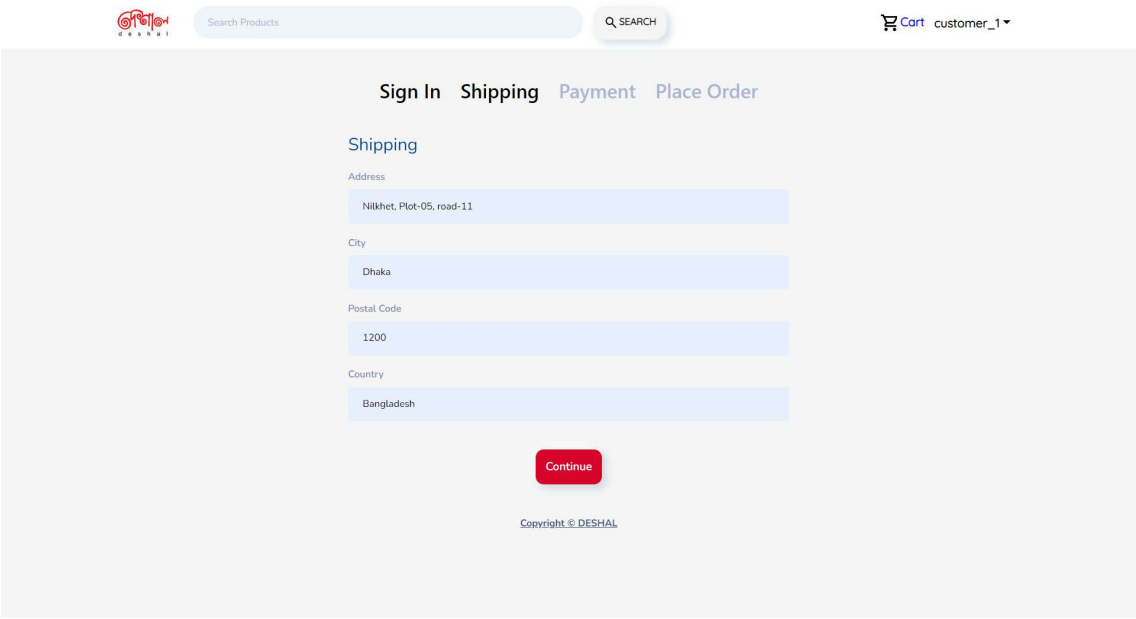

Figure 6.9: Deshal Shipping address page

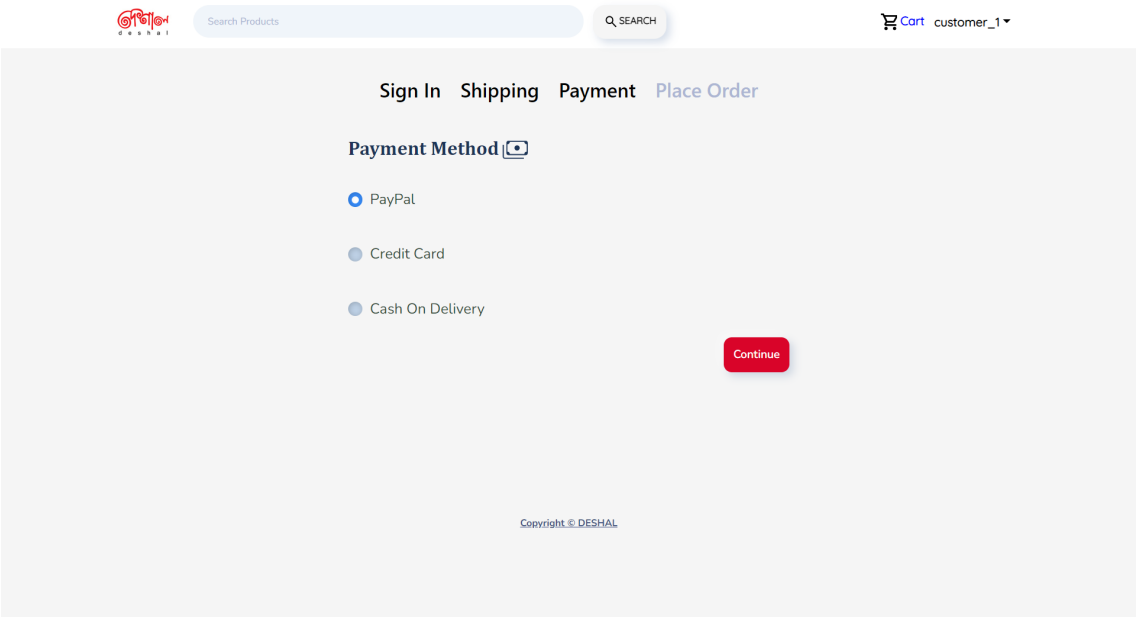

Figure 6.10: Deshal Payment page

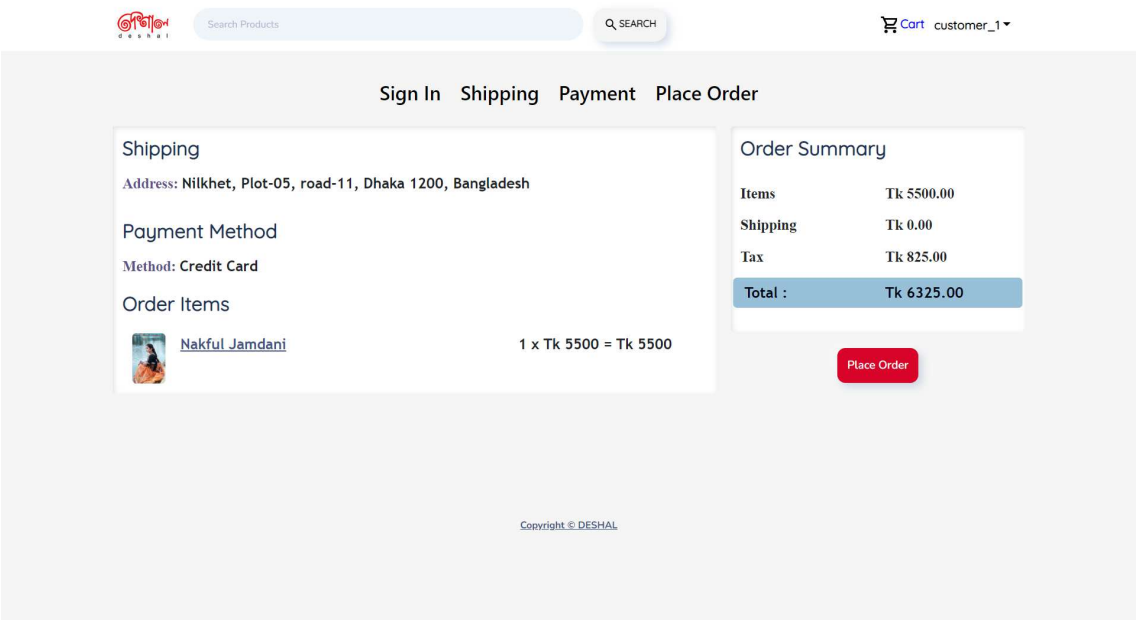

Figure 6.11: Deshal Place Order page

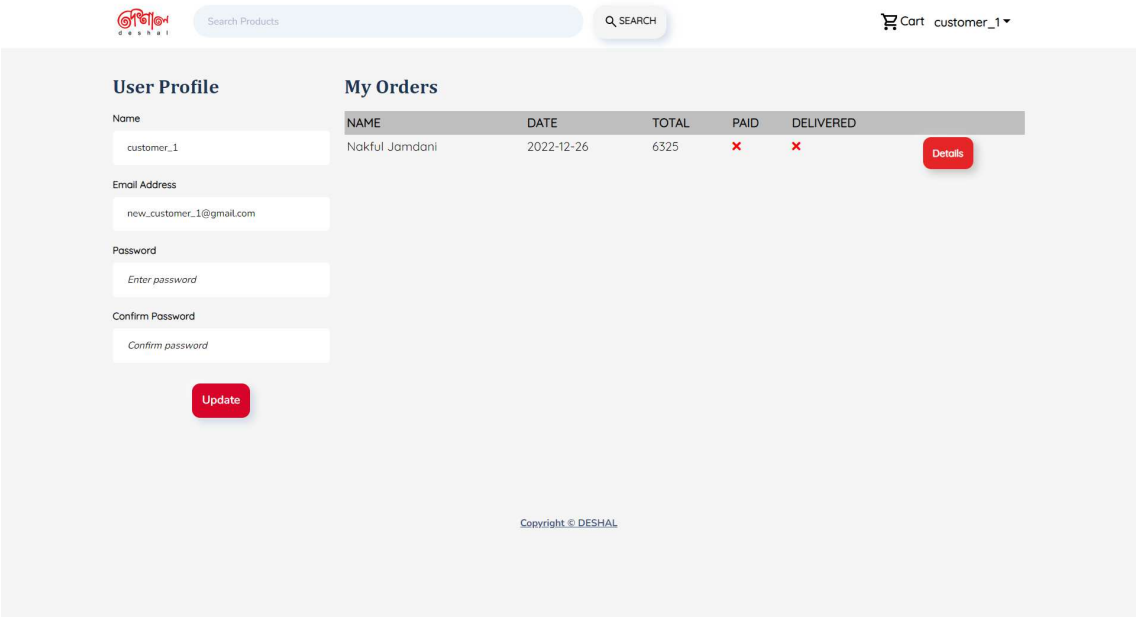

Figure 6.12: Deshal User Profile page

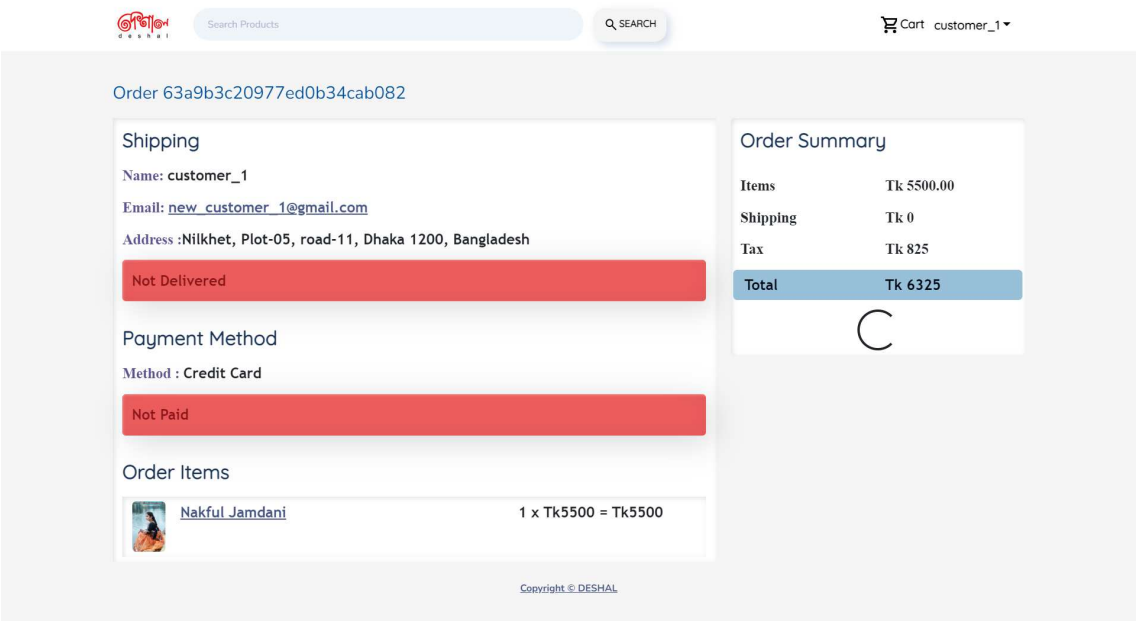

Figure 6.13: Deshal User Order details page

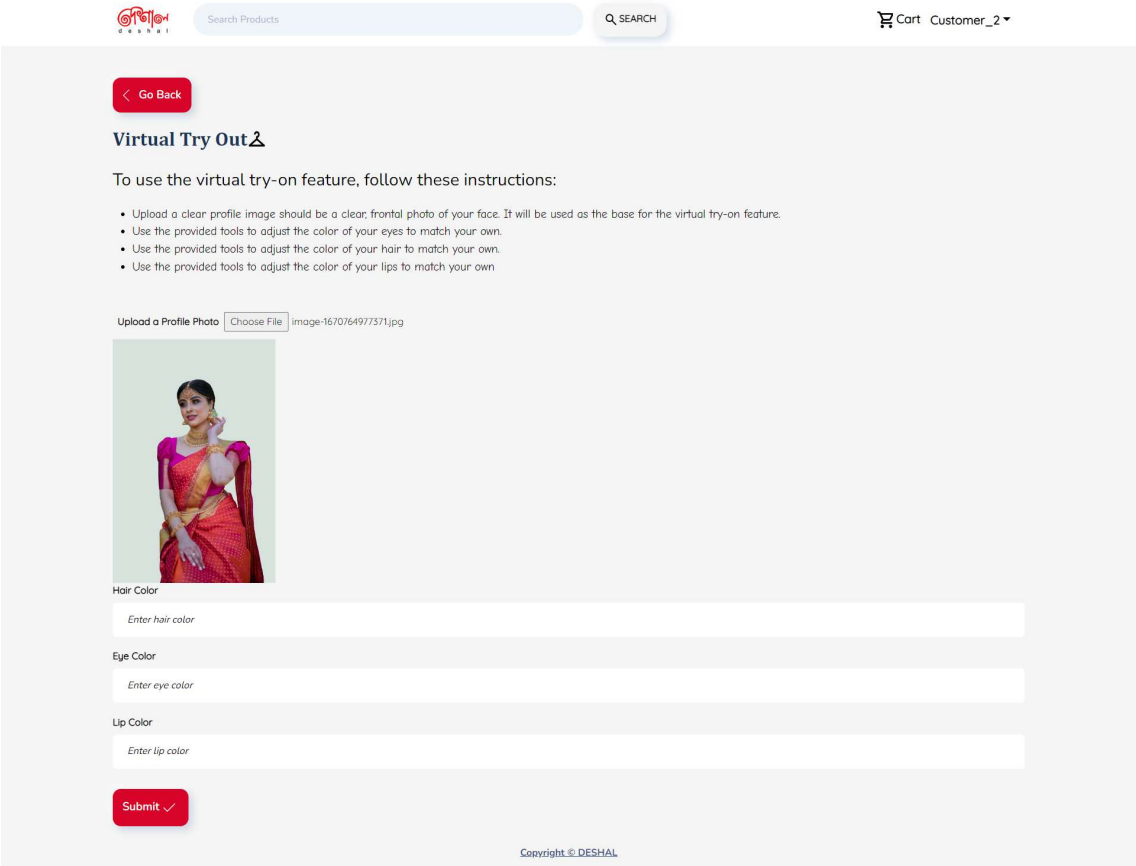

Figure 6.14: Deshal Virtual Try On Screen page

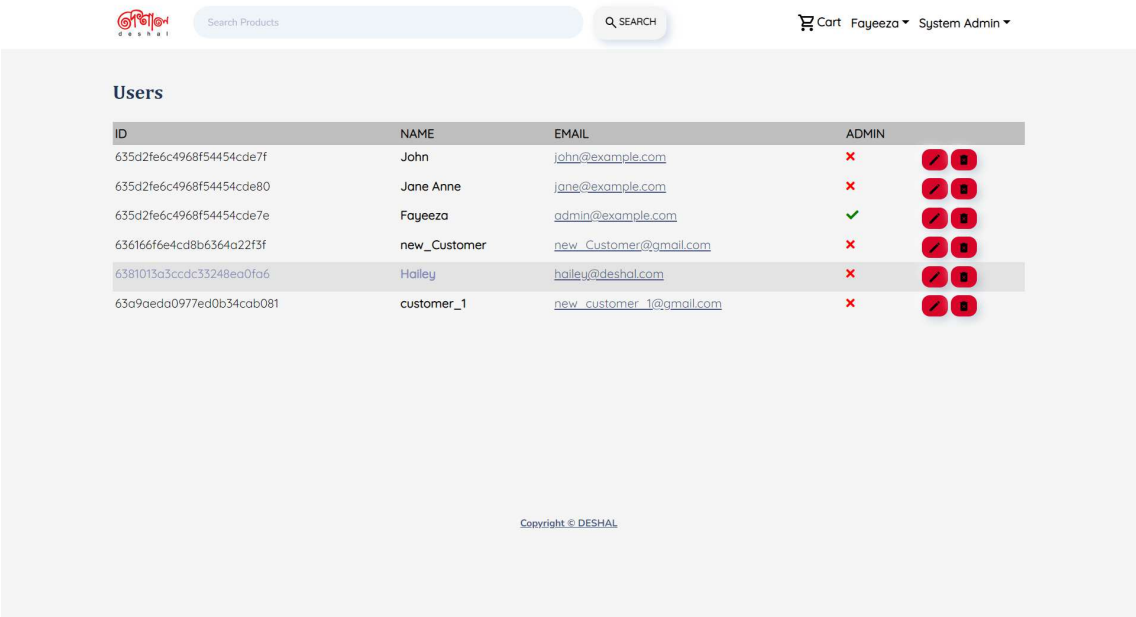

Figure 6.15: Deshal Admin user list page

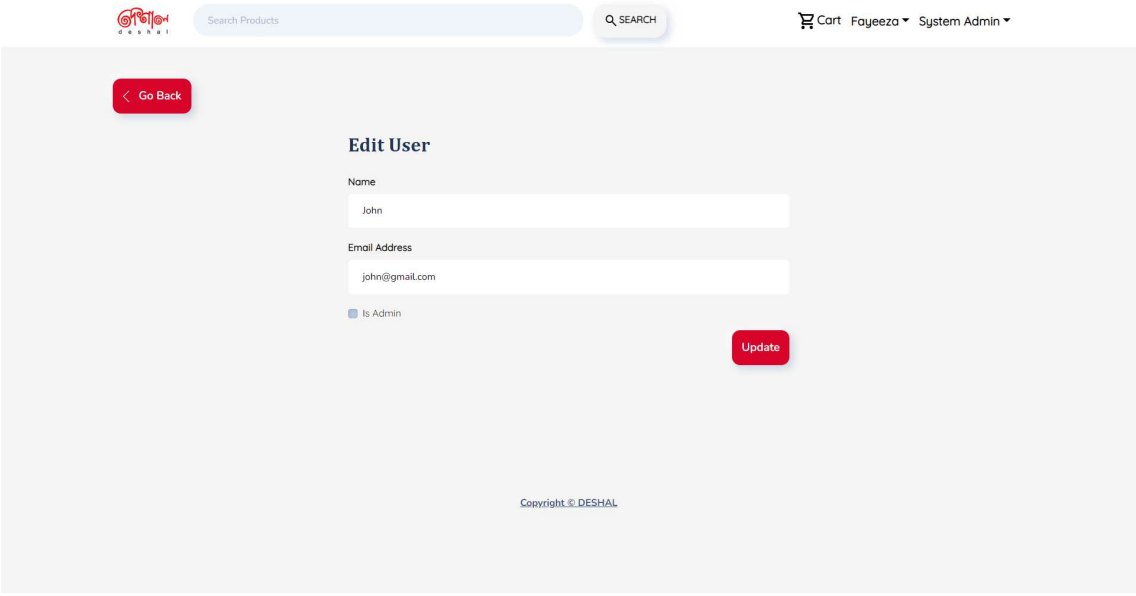

Figure 6.16: Deshal Admin user edit page

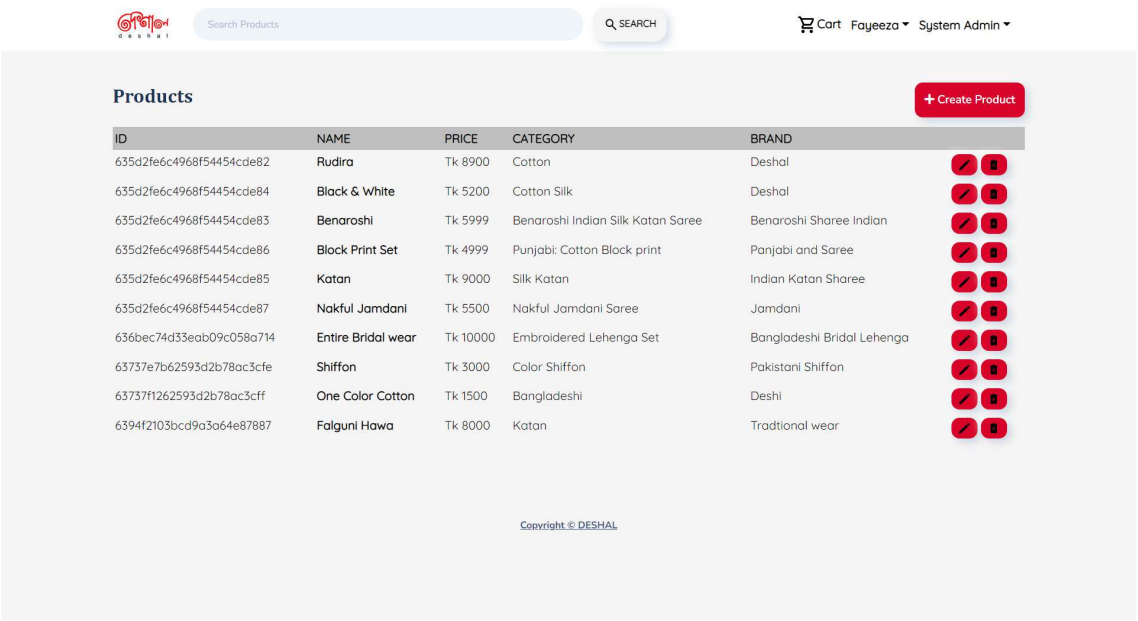

Figure 6.17: Deshal Admin product list page

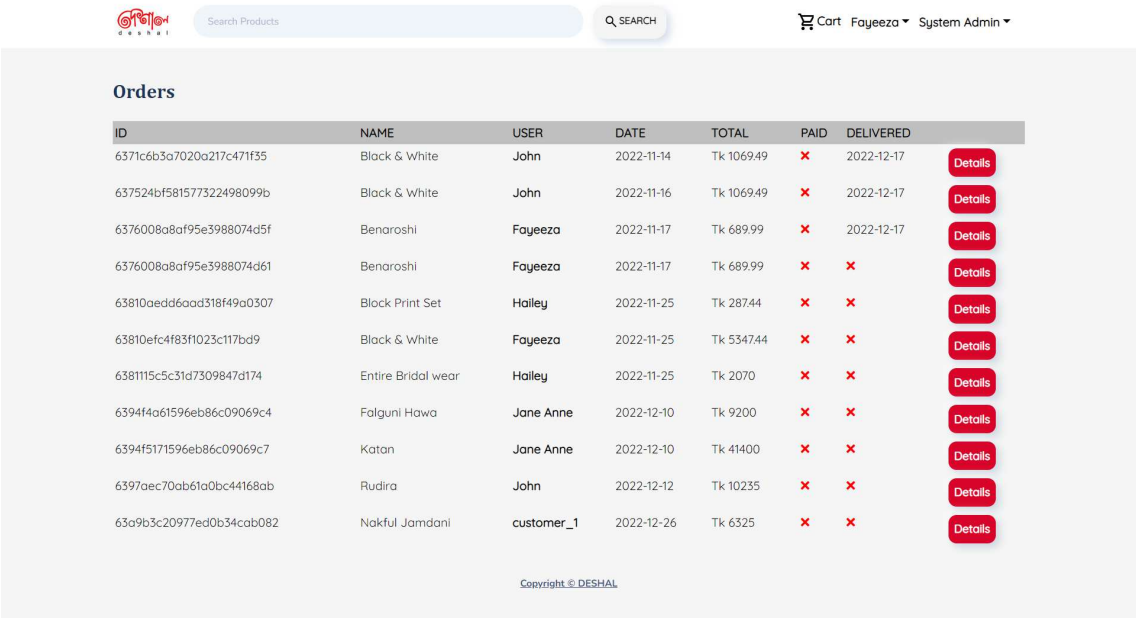

Figure 6.18: Deshal Admin order list page

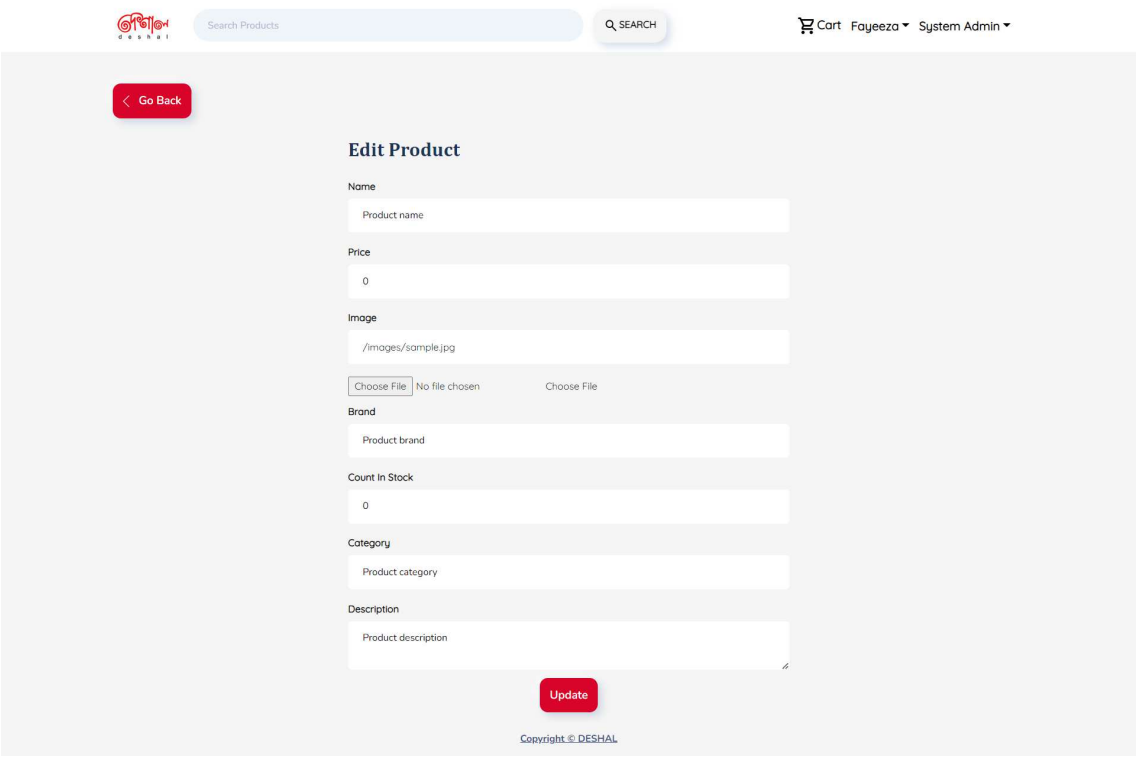

Figure 6.19: Deshal Product create and update page

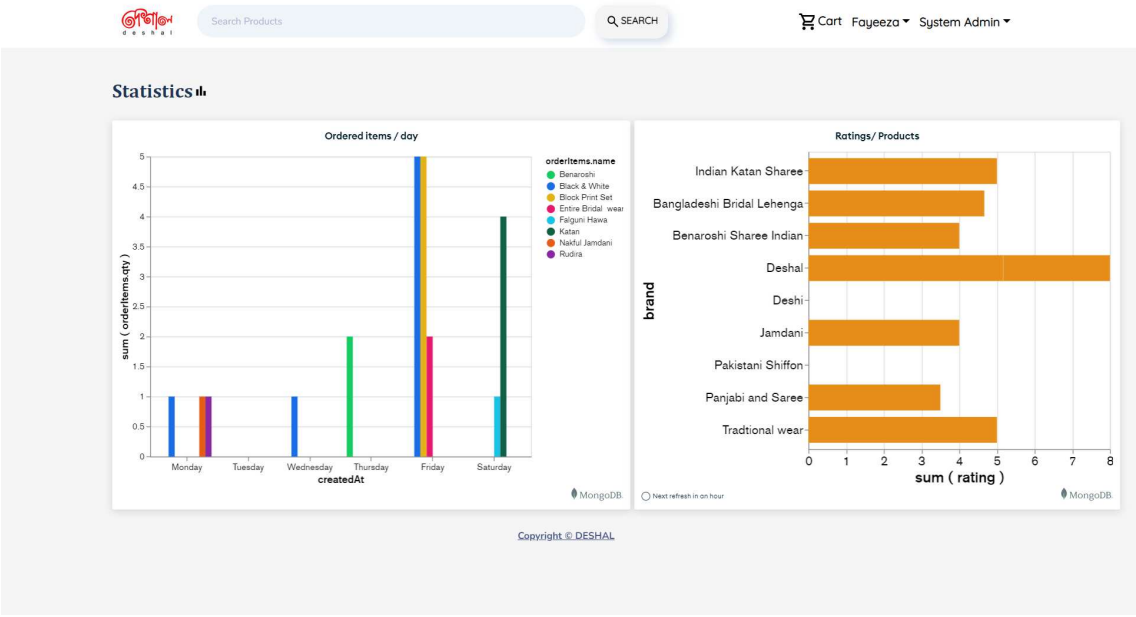

Figure 6.20: Deshal Product Statistics page

Chapter 7

Project as Engineering Problem Analysis

Projects can be thought of as engineering problems that need to be solved. The process of engineering problem analysis involves breaking down the project into smaller, more manageable parts, identifying the constraints and requirements of the project, and coming up with a plan to solve the problem. There are several steps involved in engineering problem analysis:

1. Understand the project problem: Clearly state the issue that is the target to be solved.

2. Identify the constraints: Identify any constraints or limitations that will affect the solution, such as time, budget, materials, or resources.

3. Gather information: Collect all relevant information about the problem and the constraints.

4. Develop a list of potential solutions: Generate a list of potential solutions to the problem.

5. Evaluate the potential solutions: Consider the pros and cons of each potential solution and choose the one that best meets the constraints and requirements of the project.

6. Implement the solution: Put the chosen solution into action and monitor its progress to ensure that it is effective and meets the project goals.

Engineering problem analysis is an important part of the project management process, as it helps to ensure that projects are completed efficiently and effectively.

7.1 Sustainability of the Project/Work

Sustainability in software engineering refers to the ability of a software system to continue meeting the needs of its users over the long term. A sustainable software project is one that is able to deliver value to its users over an extended period of time without requiring excessive maintenance or requiring frequent updates. There are several factors that contribute to the sustainability of a software engineering project:

- Code quality: High-quality code is easier to maintain and extend, which can help improve the sustainability of the project.
- Test coverage: Adequate test coverage helps to ensure that the software is reliable and works as intended, which can improve its sustainability.
- Documentation: Comprehensive documentation helps to make the project more maintainable and easier to understand, which can improve its sustainability.
- Collaboration: Collaboration between team members and stakeholders can help to ensure that the project is aligned with the needs of its users, which can improve its sustainability.
- Continuous integration and delivery: Using continuous integration and delivery practices can help to ensure that the project is continuously updated and improved, which can improve its sustainability.

By focusing on these factors, software engineers can help to ensure that their projects are sustainable and able to meet the needs of their users over the long term.

7.2 Social and Environmental Effects and Analysis

There are many potential positive social and environmental effects that can result from a software engineering ecommerce project. Some of the key benefits that a well-designed ecommerce project can bring include:

- Increased convenience for consumers: Ecommerce platforms make it easier for consumers to shop online, which can save them time and effort compared to traditional shopping methods.
- Increased access to products: Ecommerce platforms can also provide consumers with greater access to a wide range of products, including those that may not be available locally.
- Increased competition: Ecommerce platforms can increase competition among retailers, which can lead to lower prices and better products for consumers.

- Increased efficiency: Ecommerce platforms can also improve the efficiency of the retail industry, reducing the need for physical stores and the associated costs of maintaining them.

- Environmental benefits: Ecommerce can also have environmental benefits, such as reducing the need for transportation and packaging associated with traditional retail methods.

To analyze the positive social and environmental effects of a software engineering ecommerce project, it is important to consider the specific features and functionality of the platform and how it is used. For example, if the platform is designed to promote sustainable products and practices, or if it provides tools to help consumers make more informed and environmentally-friendly purchasing decisions, it is likely to have a greater positive impact on society and the environment. Software engineers can consider conducting a social and environmental impact analysis as part of the project planning process. This may involve analyzing the potential impacts of the project on various stakeholders and the environment, and implementing measures to reduce or offset any negative impacts.

7.3 Addressing Ethics and Ethical Issues

Ethics and ethical issues are an important consideration in any software engineering project, including ecommerce projects. Some of the key ethical issues that may arise in an ecommerce project include:

1. Privacy: Ecommerce projects handle sensitive personal and financial information, so it is important to ensure that this information is protected and used ethically.

2. Fair competition: Ecommerce platforms should ensure that all retailers are treated fairly and given equal opportunities to succeed.

3. User experience: Ecommerce platforms should prioritize the user experience and ensure that they are easy to use, accessible, and provide value to consumers.

4. Social responsibility: Ecommerce platforms should also consider their social and environmental responsibilities and strive to have a positive impact on society and the environment.

To address these ethical issues, software engineers working on ecommerce projects should ensure that they are familiar with relevant laws and regulations, such as data protection laws and fair competition laws. They should also be mindful of ethical principles, such as respect for privacy and the need to act in the best interests of users and society.

It can also be helpful to establish clear policies and guidelines for ethical behavior, and to provide training and resources to help team members understand and uphold these standards. Regular review and evaluation of ethical practices can also help to ensure that the ecommerce platform remains compliant and meets the highest ethical standards.

Chapter 8

Lesson Learned

As an intern, working on a software engineering ecommerce project, I had the opportunity to develop a range of valuable skills and knowledge. Through my experience, I learned the importance of following established software development processes and methodologies, such as agile development and Scrum. Additionally, I gained an understanding of the value of collaboration and teamwork, including how to communicate effectively, provide and receive constructive feedback, and work harmoniously within a diverse team. Furthermore, I was able to hone my problem-solving abilities, learning how to systematically tackle complex challenges, think creatively, and test and debug code.

In addition to these technical skills, I also had the opportunity to engage in professional development, such as learning how to operate within a professional setting, communicate with clients and stakeholders, and manage my time and priorities effectively. Overall, my internship was a highly enjoyable and enriching experience that has left me well-equipped to pursue a successful career in the field of software engineering.

8.1 Problems Faced During this Period

As an intern while working on this ecommerce project, I faced a number of challenges that required me to adapt:

- **Lack of experience:** As an intern with limited experience or idea in software engineering industry, I found it challenging to fully understand the concepts and technologies involved in developing a software engineering ecommerce clothing website using the MERN stack. This made it hard for me to complete tasks efficiently and required me to spend extra time learning and familiarizing myself with these technologies.
- **Limited knowledge:** I also struggled with the initial little knowledge on the MERN stack and its various components, that is MongoDB, Node.js, Express, and

React. This made it difficult for me to develop and troubleshoot code and required me to seek guidance from more experienced colleagues.

- **Communication barriers:** Working in a team with more experienced software engineers also presented communication challenges, as I had to explain my thought process whilst understanding their thought process.
- **Time management:** Managing my time effectively was a challenge, especially when working on multiple tasks and tight deadlines. I had to learn how to prioritize my tasks and allocate my time efficiently to meet my commitments.
- **Adapting to a new work environment:** Adjusting to a new work environment and company culture was also a challenge for me. I had to familiarize myself with new policies and procedures and learn how to operate effectively within this new environment.

8.2 Solution of those Problems

To overcome the challenges of working as an intern, I had to use a range of strategies, such as:

- **Seeking guidance and asking questions:** To overcome a lack of experience or knowledge, I sought guidance from more experienced colleagues and asked questions when I was unsure of something. This helped me to better understand the concepts and technologies involved in developing a software engineering ecommerce clothing website using the MERN stack, and to complete tasks more efficiently.
- **Proactively seek learning opportunities:** To address limited knowledge or experience, I proactively sought out learning opportunities, such as looking at documentation online. This helped me to gain the skills and knowledge I needed to succeed in my internship.
- **Communicate clearly and asking for help:** To overcome communication barriers with more experienced colleagues, I communicated clearly and was proactive in seeking help when needed. This involved explaining my thought process, asking clarifying questions, and being open to feedback and guidance.
- **Managing time effectively:** To address time management challenges, I prioritized my tasks, allocated my time efficiently, and stayed organized. I used tools and techniques like creating a task breakdown list and using a timestamp to schedule my tasks.

- **Adapt to the work environment:** To adjust to a new work environment, I familiarized myself with the company's policies and procedures, and sought out opportunities to learn about the company culture and how things work. I was also open to feedback and willing to adapt my approach as needed.

Chapter 9

Future Work & Conclusion

9.1 Future Works

The presented functionalities of our Deshal clothng website will be included in the first version of this platform, and while it has not yet been released, we are excited to bring it to market. We do recognize that currently few of the functionalities have room for improvements, however we are committed to continually updating and enhancing the platform in order to provide the best possible experience for our clients. In the following sections, we will discuss some of the potential future works and enhancements that we will be considering for the platform:

1. Improved personalization: The ecommerce platform could be enhanced to provide more personalized recommendations and product suggestions based on user data and preferences.

2. Improved customer service: The platform could be enhanced with features such as live chat support or video consultation to provide a more personalized and efficient customer service experience.

3. Integration with social media: The platform could be integrated with social media platforms to allow users to share their purchases and recommendations with friends and followers.

4. Sustainable sourcing and production: The platform could focus on sourcing and producing clothing in a more sustainable and ethical manner, such as by partnering with eco-friendly brands or using sustainable materials.

5. Enhancing security and privacy: Security and privacy are critical concerns for any ecommerce platform, and there may be opportunities to improve the platform's security measures or to implement new privacy controls.

6. Integrating with other systems: The ecommerce platform could also be integrated with other systems, such as inventory management or accounting software, to improve efficiency and streamline business operations.

7. Expanding internationally: The ecommerce platform could also be expanded to reach a wider global audience, by adding support for multiple languages and currencies, for example.

8. Improving the existing system: There may be opportunities to improve the existing system by fixing bugs, optimizing performance, or adding new features that enhance the user experience or the functionality of the platform. This could involve updating the platform's technology stack or redesigning certain features or processes. By continuously improving the existing system, the ecommerce platform can remain competitive and provide a high-quality experience to its users.

9.2 Conclusion

In conclusion, my internship at AlterSense Limited has been an invaluable opportunity for professional and personal development. The software engineering clothing website project allowed me to enhance my skills and knowledge in a real-world setting, and afforded me the opportunity to learn from and collaborate with a talented team of professionals.

I am especially grateful for the chance to work on a live project and contribute to the development of the ecommerce platform. As a starting intern, it is rare to be given the opportunity to work on an ongoing project, and I am thankful to my team and the company for entrusting me with this responsibility.

I would like to express my sincere gratitude to my university supervisor and office supervisor for their guidance and support throughout my internship. Their mentorship has been instrumental in my growth and success, and I am deeply appreciative of their invaluable guidance.

Overall, my internship at AlterSense Limited has been a truly enriching and rewarding experience. I am grateful for the opportunity to intern with such a talented and supportive team, and I will always look back on this experience with fond memories. Thank you to everyone who has contributed to my development and success during this internship.

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An Undergraduate Internship/Project on yourTopic

By

Fayeeza Subah Islam

Student ID: 1920044

Autumn, 2022

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.

29.1.23

(Signature of the Supervisor)

Mahmudul Islam

Name of the Supervisor

Department of Computer Science & Engineering

Independent University, Bangladesh