COLLEGE OF APPLIED BUSINESS AND TECHNOLOGY

Kathmandu, Nepal

(Affiliated to Tribhuvan University)

E-COMMERCE PROJECT REPORT

ON

SBSOPTICS: LENSES AND GLASSES SELLING E-COMMERCE WEBSITE

Submitted by:

Names: Sudeep Raj Karki (28657/078)

Bipin Aryal(28637/078)

Swostik Paneru(28660/078)

Submitted to:

Indra Chaudhary

e-commerce Instructor

Semester: Six

Faculty: Science and Technology

Level: Bachelor

Program: Computer Science and Information Technology

April, 2024

ACKNOWLEDGEMENT

To everyone who contributed to the success of this endeavor, we are deeply grateful. We would like to begin by expressing our heartfelt appreciation to our instructor, **Mr. Indra Chaudhary**, for his valuable advice, continuous support, and constructive feedback. His guidance and instruction have played a significant role in our growth as students and researchers, and we are truly thankful for his dedication and encouragement throughout this journey.

We also want to express our gratitude to everyone who took part in the research and contributed the information we needed. Finally, we want to thank our loved ones and close friends for their continuous support and inspiration. Throughout our academic career, their support and devotion have been a continual source of inspiration. Once more, we would want to express our gratitude to everyone who helped make this initiative a success. We are grateful.

ABSTRACT

This report focuses on the development of SBSOptics.com, an e-commerce website dedicated to the sale of lenses and glasses. The project aims to create an efficient, user-friendly platform that meets the growing demands of customers in the online optical market. The report outlines the project's goals, constraints, and the development methodology used, which follows the waterfall model for structured and phased development.

The report examines the effectiveness of various features and technologies in the creation of successful e-commerce platforms, with an emphasis on secure payment systems, intuitive user interfaces, and seamless prescription verification processes. Key features such as user registration, product browsing, prescription uploads, and order management are also discussed, highlighting how these contribute to an enhanced shopping experience.

Furthermore, the report provides insights into the system's analysis, design, implementation, and testing phases. Each phase was carefully executed to ensure a reliable and functional platform. The conclusion reflects on the project's success in addressing the challenges of the online optical market, while the suggested next steps focus on further enhancements to improve personalization, integrate social media, and develop a dedicated mobile application.

Overall, SBSOptics.com has been positioned as a robust and scalable e-commerce solution for the sale of lenses and glasses, with significant potential for future growth and optimization in the digital optical marketplace.

Table of Contents

Table of figures

CHAPTER 1: INTRODUCTION

1.1 Project Introduction

The project aims to introduce SBSOptics.com, an innovative e-commerce platform dedicated to the sale of lenses and glasses. As the demand for online shopping continues to grow, there is a need for a specialized optical website that offers a seamless and convenient shopping experience for customers. SBSOptics.com seeks to fill this gap by providing a comprehensive online marketplace where customers can easily explore and purchase a wide variety of lenses, glasses, and optical accessories from the comfort of their homes.

The primary goal of SBSOptics.com is to create a user-friendly platform that caters specifically to individuals seeking high-quality eyewear, offering a diverse collection of glasses and lenses from top brands, along with various styles and sizes. By partnering with reputable optical manufacturers and retailers, SBSOptics.com aims to become the go-to destination for customers looking for stylish, functional, and reliable eyewear.

Through an intuitive and well-designed website interface, SBSOptics.com strives to enhance the overall shopping experience. The platform will feature advanced search and filtering options, allowing customers to navigate easily through the extensive catalog and find the perfect pair of glasses or lenses to suit their needs. Personalized recommendations based on browsing history and customer preferences will help users discover new styles and products that match their unique taste.

To ensure a secure and trustworthy shopping environment, SBSOptics.com will integrate robust payment gateways and stringent security measures to protect customer data and financial transactions. The platform will also offer efficient order tracking and delivery services, providing customers with real-time updates on their purchases and ensuring timely delivery right to their doorsteps.

1.2 Problem of Statement

The traditional retail industry is facing challenges with the rise of online shopping, particularly in the optical market. In the lens and glasses industry, there is a lack of a specialized e-commerce platform focused solely on eyewear. This presents challenges for both customers and businesses.

For customers, finding the right pair of glasses or lenses on existing online platforms can be difficult. The search and filtering options are often limited, leading customers to sift through unrelated products. Additionally, many platforms fail to offer a detailed product catalog, leaving customers with inadequate information about the eyewear, such as sizing details, prescription compatibility, material quality, and high-resolution images.

For businesses, there is a lack of an efficient platform to showcase their wide range of optical products, making it harder to connect with customers seeking specific types of eyewear.

In summary, the absence of a specialized online platform for selling lenses and glasses makes it inconvenient for customers to find eyewear that meets their needs, while businesses struggle to effectively present their products in a competitive and personalized way.

1.3 Objectives of the Project

The following is an overview of the project's main goals:

- Develop a user-friendly platform.
- Create a diverse collection of lens and glasses.
- Provide accurate product information.
- Facilitate secure transactions.
- Enable social sharing and customer engagement.

1.4 Limitations of the Project

- Limited brand partnerships.
- Challenges in inventory management.
- Building customer trust and brand awareness.
- Difficulties in payment integration.
- Technical constraints.
- Logistics of shipping and delivery.

1.5 Assignment of roles and responsibilities

Team Members: Bipin Aryal, Sudeep Raj Karki , Swostik Paneru

1. Swostik Paneru – Backend & API Developer (Laravel + MySQL)

Responsibilities:

- Set up and maintain the Laravel backend structure
- Design and develop RESTful APIs for product listings, cart, user authentication, order processing, etc.
- Implement user roles (admin, customer) and authentication
- Integrate payment gateway (if applicable)
- Manage database schema and queries using MySQL
- Handle server-side validation, business logic, and security
- Provide API documentation for frontend integration

2. Bipin Aryal – Frontend Developer (React + UI/UX Integration)

Responsibilities:

- Build user-facing interfaces using React
- Integrate with backend APIs for dynamic product display, user authentication, shopping cart, and orders
- Develop responsive layouts and reusable components
- Handle client-side validation and error handling
- Optimize performance and ensure cross-browser compatibility
- Assist with UI design using HTML/CSS/JavaScript as needed

3. Sudeep Raj Karki – UI/UX Designer & Full-stack Support (HTML/CSS/JS + Coordination)

Responsibilities:

- Design wireframes and mockups for the website (homepage, productpages, checkout,etc)

- Implement clean and modern UI using HTML/CSS/JavaScript
- Ensure mobile responsiveness and accessibility standards
- Support backend and frontend members with layout, styling, and UI fixes
- Test full application flow and report bugs
- Coordinate team meetings, version control (Git), and deployment assistance

1.6 Report Organization

This report is organized into five comprehensive chapters, each addressing a key aspect of the SBS Optics e-commerce system development. The structure ensures a logical flow of information, from the initial concept to final implementation and conclusions. A brief overview of each chapter is as follows:

Chapter 1: Introduction – Covers the project overview, problem statement, objectives, limitations, team roles, and report structure.

Chapter 2: Requirement and Feasibility Analysis – Includes analysis of existing systems, selected development model, system requirements, and feasibility study.

Chapter 3: System Design – Presents system architecture, database design, process flow diagrams, and any relevant algorithms.

Chapter 4: Implementation – Describes the development process, tools used, and testing phases including unit, integration, and system testing.

Chapter 5: Conclusion and Future Enhancement – Summarizes the project outcomes and suggests possible future improvements.

CHAPTER 2: REQUIREMENT AND FEASIBILITY ANALYSIS

2.1: Existing Systems Overview

System 1: Lenskart

Introduction: Lenskart is a popular Indian eyewear e-commerce platform that offers a wide range of eyeglasses, lenses, and sunglasses. It includes features like virtual try-on, home eye checkups, and AI-based recommendations.

Pros:

- Wide product range with detailed filtering options
- Virtual try-on feature improves customer experience
- Strong logistics and delivery tracking
- Good customer support and return policy

Cons:

- Complex UI can overwhelm first-time users
- High system load can occasionally lead to slow performance
- Premium services not available in all regions

System 2: EyeBuyDirect

Introduction: EyeBuyDirect is a U.S.-based eyewear retailer offering glasses and lenses online. It focuses on budget-friendly frames and offers a straightforward shopping experience.

Pros:

- Simple and user-friendly interface
- Competitive pricing
- Frequent discounts and deals
- Easy order customization

Cons:

- Limited to online support (no physical try-on or consultation)
- Shipping delays in certain regions
- Product range is smaller than major competitors

2.2: System development model

The Waterfall Model was selected for the SBS Optics project due to its structured and sequential approach, which aligns well with the clearly defined project scope and requirements.

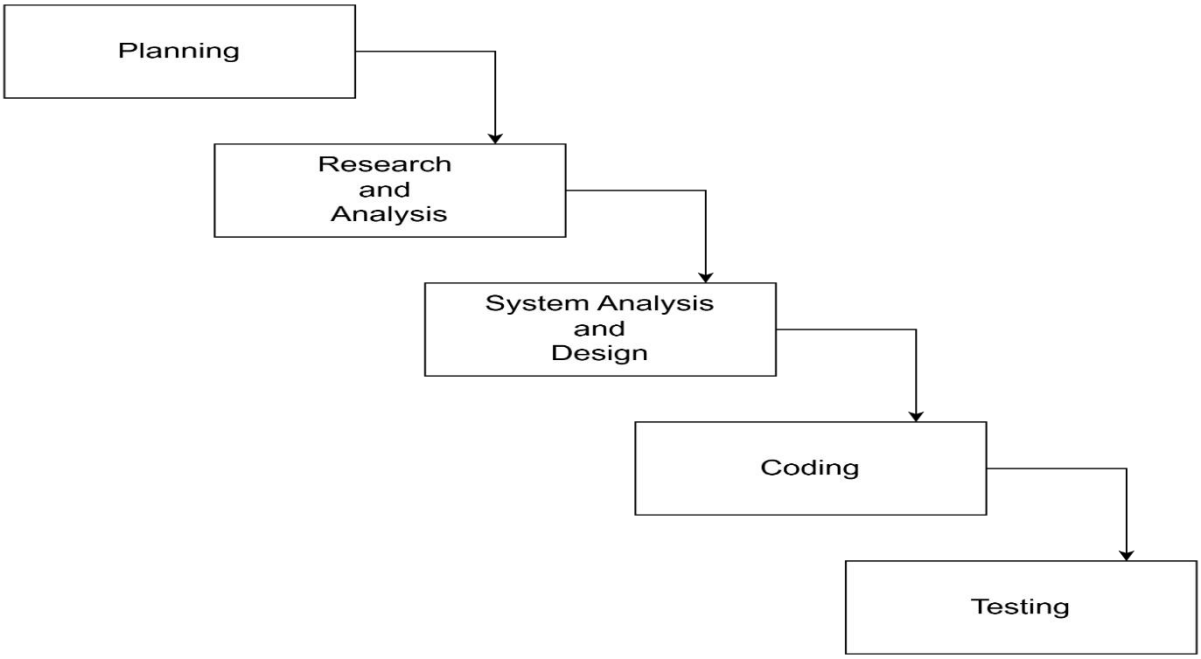

Figure 1 Waterfall model

- Well-defined Requirements: The project has clear and fixed requirements from the beginning, making the linear flow of the Waterfall model suitable.
- Simple and Structured Approach: Waterfall allows for disciplined development with clear milestones at each phase (analysis, design, implementation, testing, deployment, and maintenance).
- Ease of Management: It is easier to manage progress, deadlines, and responsibilities as each phase must be completed before moving to the next.

- Ideal for Academic Projects: For a short-term academic project like SBS Optics, the Waterfall model ensures that all documentation and phases are completed in an orderly and traceable way.

This model ensures smooth project execution and timely delivery, especially when there is limited risk of frequent changes in requirements.

2.3 Requirement Analysis

2.3.1 Functional Requirements

Essential features and capabilities define the functional requirements of a lens and glasses -selling ecommerce website. These requirements shape the website's development, ensuring it meets customer expectations and delivers a seamless shopping experience. By understanding and addressing these requirements, the website can enhance usability, satisfaction, and business success.

Some functional requirements for this project are listed below:

- User Registration & Login (with CAPTCHA)
- Product catalog and filtering
- Wishlist and cart features
- Order placement and payment via eSewa
- Admin panel for CRUD operations
- Order tracking and receipt generation

A use case diagram is a visual representation of how actors interact with a system. It shows the different actions users can perform and their relationships to the system. It helps with requirements gathering, system design, and stakeholder communication. Use case diagram for our project is shown below:

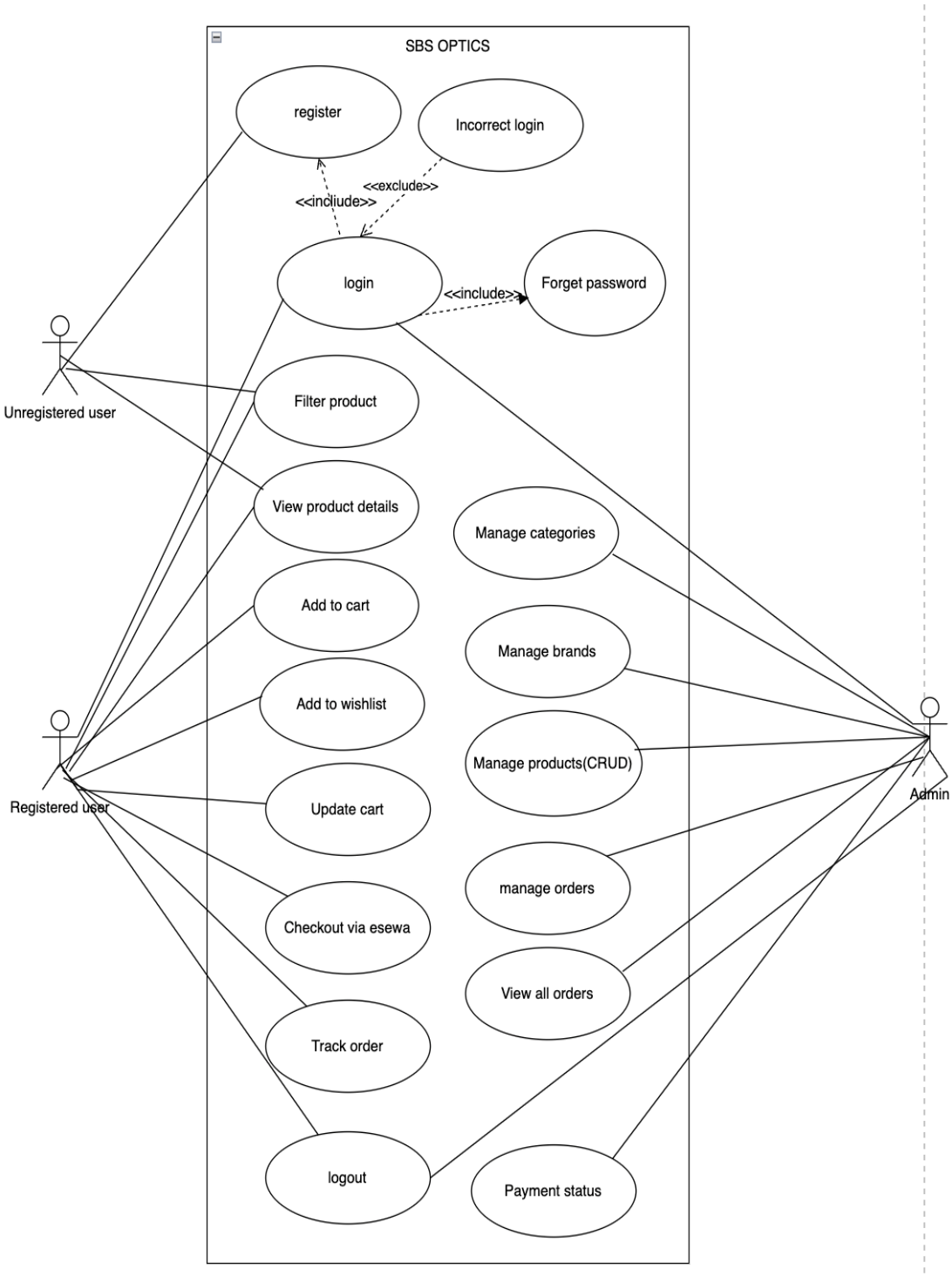

Figure 2 Use Case Diagram for SBSoptics

2.3.2 Non-Functional Requirements

- Usability: The system should have a user-friendly interface, with intuitive navigation and clear instructions, to ensure ease of use for both customers and administrators. It should provide a seamless and pleasant user experience.
- Reliability & Availability: The system should be highly reliable and available, ensuring minimal downtime and uninterrupted access to the e-commerce website. It should have robust backup and recovery mechanisms to prevent data loss and ensure system stability.
- Performance: The system should be able to handle a large number of concurrent users and process transactions efficiently. It should provide fast response times, quick page loading, and smooth browsing and checkout experiences to ensure optimal performance.
- Security: The system should implement strong security measures to protect customer data, including personal information, payment details, and order history. It should have secure authentication and authorization mechanisms, encryption protocols, and robust protection against common security threats, such as hacking and data breaches.
- Scalability: The system should be designed to handle future growth and accommodate increasing user traffic and data volume. It should be scalable and able to handle additional product listings, users, and transactions without significant performance degradation.
- Compatibility: The system should be compatible with different web browsers, operating systems, and devices to ensure a seamless user experience across a variety of platforms. It should be responsive and adaptable to different screen sizes and resolutions.
- Maintainability: The system should be built using modular and well-structured code that is easy to maintain and update. It should adhere to coding best practices and standards, allowing for future enhancements and modifications.
- Compliance: The system should adhere to applicable laws, regulations, and industry standards, such as data protection and privacy laws, consumer rights, and e-commerce regulations. It should ensure compliance with relevant policies and guidelines to protect customer rights and maintain ethical practices.

2.4 Feasibility Study

We will evaluate the advantages and disadvantages of our method with the aid of such a feasibility analysis. We can use the information throughout this feasibility report as well as its considerations like a stable platform for evaluating where and when to move ahead. Furthermore, it will aid in making choices regarding the most appropriate software and hardware combinations:

i. Technical Feasibility:

The technical feasibility analysis assesses whether the necessary infrastructure and technology are available to support the development and maintenance of the site. It considers factors such as 12 hardware, software, and networking capabilities, as well as scalability and compatibility with different devices and platforms. As SBSOptics is an ecommerce site for glasses and lenses, the infrastructure and technology needed for it easily available within the mark. Similarly, it is compatible with all browsers and devices as required.

ii. Economic Feasibility:

There is no building expenses involved with this e-commerce website. This technique is simple to employ and grasp. As a result, spending on testing and training is not necessary. Our website can continue to develop by incorporating features for both buyers and sellers. No additional hardware is needed for such a system. The recipient of all this technique does not need any additional equipment. This project is economically viable because its value outweighs its price.

iii. Operational Feasibility:

There is no requirement for instructions to utilize the product because of its user-friendly design. This can be used effectively in a development environment with very little effort. Since it addresses the challenges associated with traditional shoe-selling methods and aims to provide a dedicated e-commerce platform for the sale of lenses and glasses, this approach is operationally viable.

iv. Schedule Feasibility:

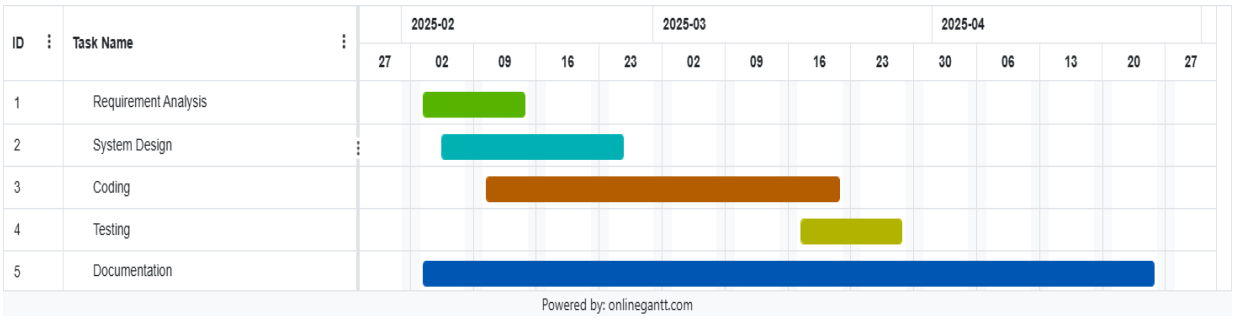

Figure 3 Gannt Chart

CHAPTER 3: SYSTEM DESIGN

3.1. System Architecture:

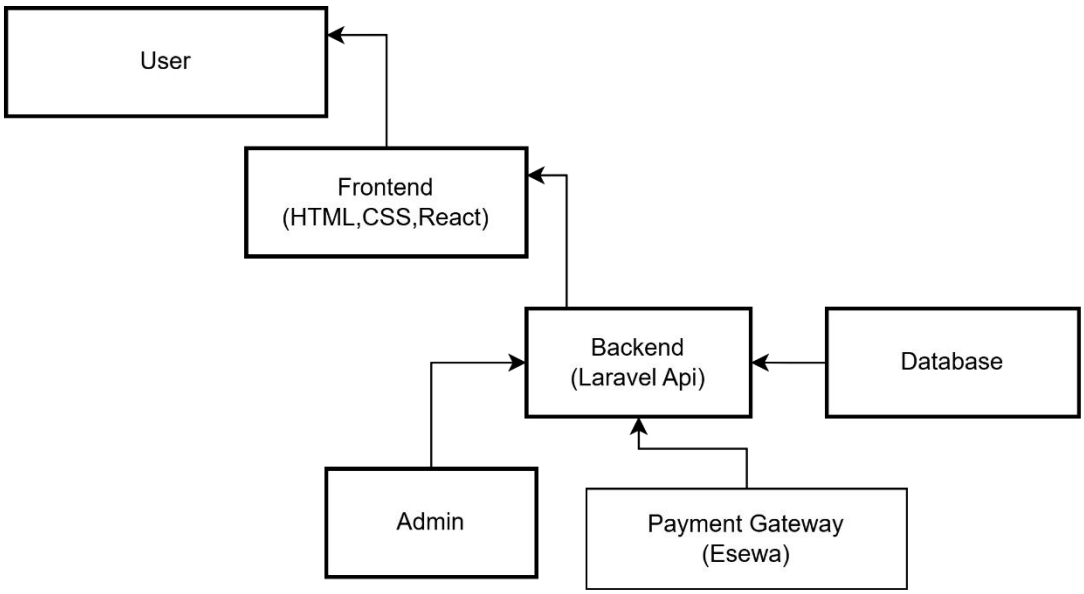

Figure 4 Block Diagram of System

Working Procedure

- User Interaction: Customers visit the SBS Optics website to browse and purchase glasses or lenses. They interact with the React frontend, which presents a responsive and user-friendly interface.
- Frontend (React): Handles UI rendering, product display, form submissions, and validations. Sends HTTP requests (via Axios or Fetch) to the Laravel backend API for actions like registration, login, adding to cart, and placing orders.
- Backend (Laravel): Acts as the core application logic layer. Handles user authentication, order processing, product management, and data validation. Communicates with the MySQL database to fetch or store data.
- Database (MySQL): Stores structured data such as product details, user profiles, order histories, and admin configurations. Ensures data integrity and fast retrieval.
- Admin Panel: Accessible by administrators for managing products, orders, user queries, and inventory. Interacts with the backend to update and monitor platform activities in real-time.

3.2. Database Design

3.2.1 Class Diagram

This class diagram provides an overview of the database that we have designed for our website.

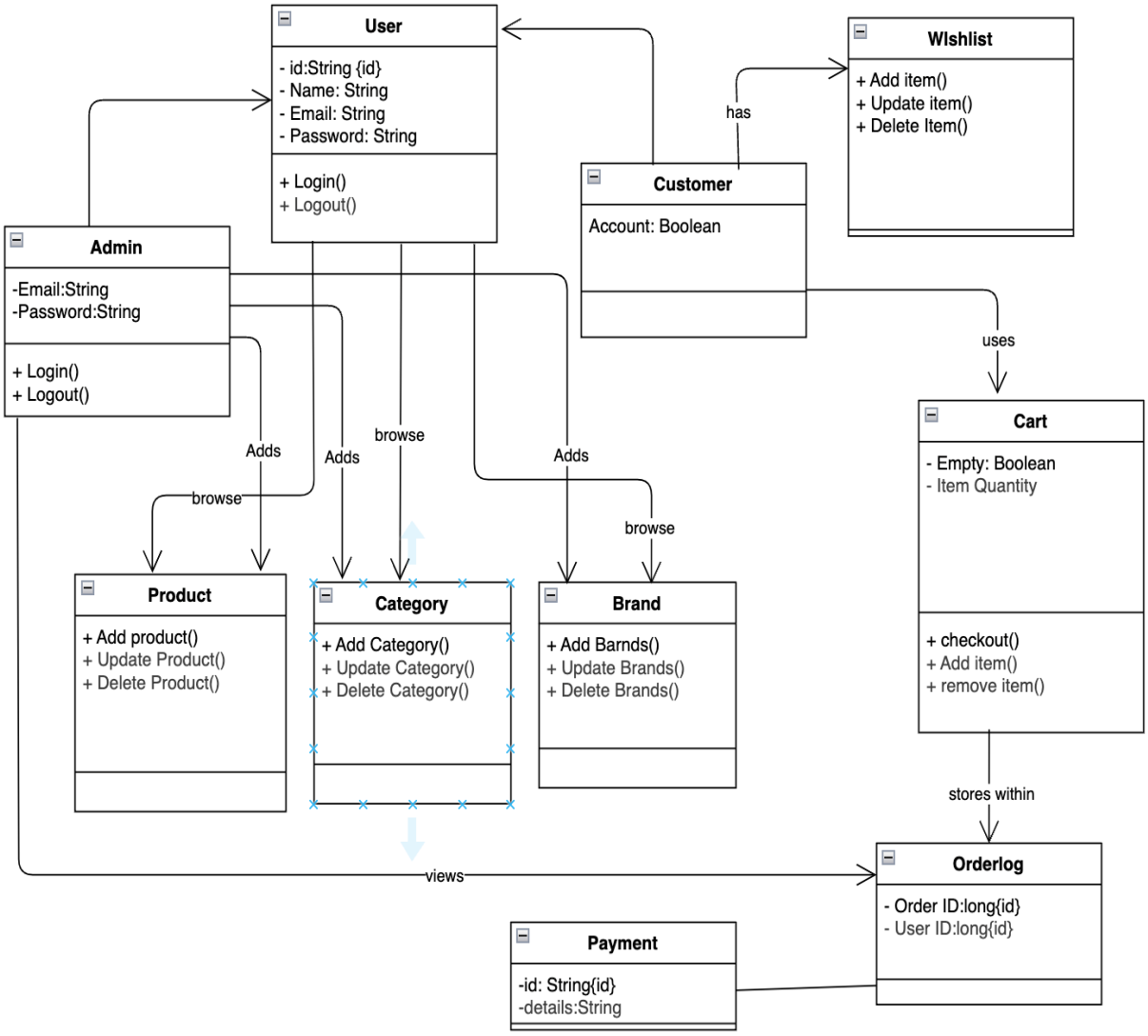

Figure 5 Class diagram for SBSOptics

3.3. Process Design

3.3.1 Sequence Diagram: SBSOptics E-commerce

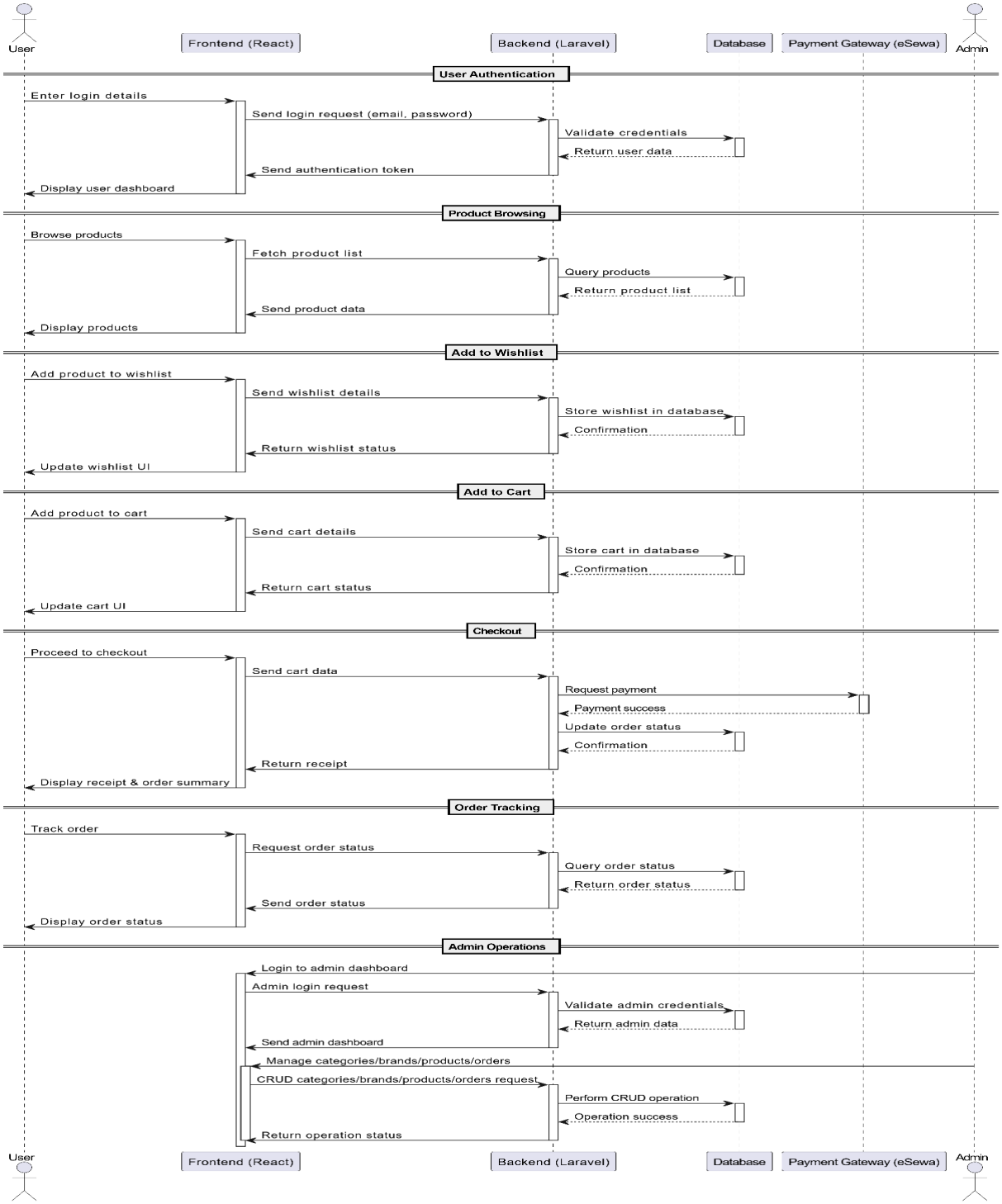

Figure 6 Sequence Diagram for SBSOptics

CHAPTER 4: IMPLEMENTATION

4.1 Implementation

- Overview of Implementation

The implementation of the SBS Optics e-commerce platform involved converting system designs and requirements into a fully functional web application. The development process was systematic and structured, ensuring each phase was completed before moving to the next. This approach allowed for thorough documentation, clear timelines, and a well-defined scope for each development phase.

- Development Methodology Adopted

The Waterfall development model was adopted for this project. It is a linear and sequential approach where progress flows in one direction—through the stages of requirement analysis, system design, implementation, testing, deployment, and maintenance. Each phase must be completed before the next beginning, ensuring a disciplined and well-documented development cycle.

4.1.1 Tools Used

- Laravel (PHP): Laravel is the primary backend framework used in this project. It is a robust PHP framework that simplifies the development of web applications. Laravel provides built-in tools for routing, authentication, database management, and more, making it ideal for handling the backend logic of SBS Optics.
- MySQL: MySQL is the database chosen for this project. It is a reliable and high-performance relational database management system that integrates seamlessly with the Laravel backend. It is used to manage and store data, including user profiles, product listings, and transaction records.
- HTML/CSS/JavaScript: HTML and CSS are used for structuring and styling web pages. With Bootstrap, a responsive design is ensured, making the platform accessible and user-friendly across devices. JavaScript is utilized for client-side interactivity, such as form validation and dynamic content updates.

- React: React is used to build the frontend of the application. Its component-based architecture and efficient rendering help create a dynamic and responsive user interface, providing an optimal experience for customers browsing and purchasing eyewear products.
- Draw.io: Draw.io is employed to create various diagrams such as flowcharts, use case diagrams, sequence diagrams, and more. These diagrams help in visualizing the system's architecture and the flow of data, ensuring better clarity during development

4.2 Testing

4.2.1 Unit Testing

We employed an instance of input along its related outputs to conduct uniting testing. Unit tests separate a piece of code as well as ensure that it is valid.

Table 4. 1 Test case for User Registration

S. N	Test id	Test description	Expected Result	Actual Result	Remarks
1	TC-01	Register a new customer by entering name, email address, password and confirm password	Redirect to the homepage with the current user auth.	Redirected to the homepage with the current user auth.	Pass
2	TC-02	Login with the registered email and password	successfully logged in after activating their account	Successfully login after receiving their account	Pass
3	TC-03	Enter valid admin email address	Display dashboard for the admin user	Displayed dashboard for the admin user	Pass
4	TC-04	Enter incorrect details to register.	The account should not be registered	Registration Failed	Pass

Table 4. 2 Test Case for User Login

S. N.	Test id	Test Detail	Expected Result	Actual result	Remarks
1	TC- 01	Enter valid email address and password	Homepage with products are displayed.	Displayed Homepage with products.	Pass
2	TC- 02	Enter invalid email address and password	Error message displayed.	Displayed error message.	Pass

Table 4. 3 Test Case for adding new product

S. N.	Test id	Test Detail	Expected Result	Actual result	Remarks
1	TC-01	Select the add product section for adding the new product	Successfully submitted and display in the products section	Displayed in the products section	Pass
2	TC-02	Leaves a required field blank	failed product validation message is displayed	Displayed product validation message	Pass
3	TC-03	Enter a title description that exceeds maximum character limit	Error message should be displayed.	Displayed error message.	Pass

Table 4. 4 Test Case for Ordering and Transaction testing

S. N .	Test id	Test Detail	Expected Result	Actual result	Remarks
1	TC-01	Enter appropriate details to place the order.	Transaction is successful and user is redirected to a conformation page.	Successful transaction	Pass
2	TC-02	Review order details including the item, quantity, price, and shopping information	Order details should match the information	Matched ordered information	Pass
3	TC-03	Enter invalid details to place the order	Error message should be displayed	Displayed error message	Pass

4.2.2 System Testing

Table 4. 5 System Testing

Test id	Test description	Expected Result	Actual Result	Remarks
TC-01	After registration, login is done with user name and password.	Show the Homepage for the user	Showed the Homepage for the user	Pass

CHAPTER 5: CONCLUSION AND FUTURE ENHANCEMENT

5.1 Conclusion

In conclusion, the completion of this project has led to the successful development and implementation of a specialized e-commerce platform for the sale of lenses and glasses. Through thorough analysis, effective requirements gathering, and the application of a waterfall development methodology, we have overcome the challenges faced by the optical retail industry in the digital age. By utilizing Laravel for the backend and React for the frontend, we have built a robust, scalable, and user-friendly web application that meets the needs of both customers and businesses.

The system's key features, including user registration, product listing, prescription verification, payment processing, and order management, have been meticulously designed and tested to ensure functionality, performance, security, and usability. With Laravel, we have ensured a secure and efficient backend infrastructure, while React has enabled the creation of a dynamic and responsive user interface. Together, these technologies offer a seamless experience for customers shopping for lenses and glasses, while providing businesses with a reliable platform to manage and sell their products.

By addressing the limitations of existing online optical marketplaces, our platform provides a tailored and convenient shopping experience. It also positions SBS Optics as a valuable asset in the rapidly evolving digital landscape of the optical retail industry. With the successful implementation of this system, we have laid the foundation for future enhancements and scalability, ensuring that the platform can continue to grow and meet the needs of both users and businesses.

5.2 Future Enhancement

a) Enhanced Personalization: Implement advanced personalization features to cater to individual customer preferences, such as personalized product recommendations and tailored marketing campaigns.

b) Integration with social media: Integrate the e-commerce platform with popular social media channels to expand product reach and leverage the power of social sharing for increased visibility and customer acquisition.

c) Mobile Application Development: Develop a dedicated mobile application for optimized shopping experiences, leveraging native device features and providing convenience for mobile users.

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APPENDIX

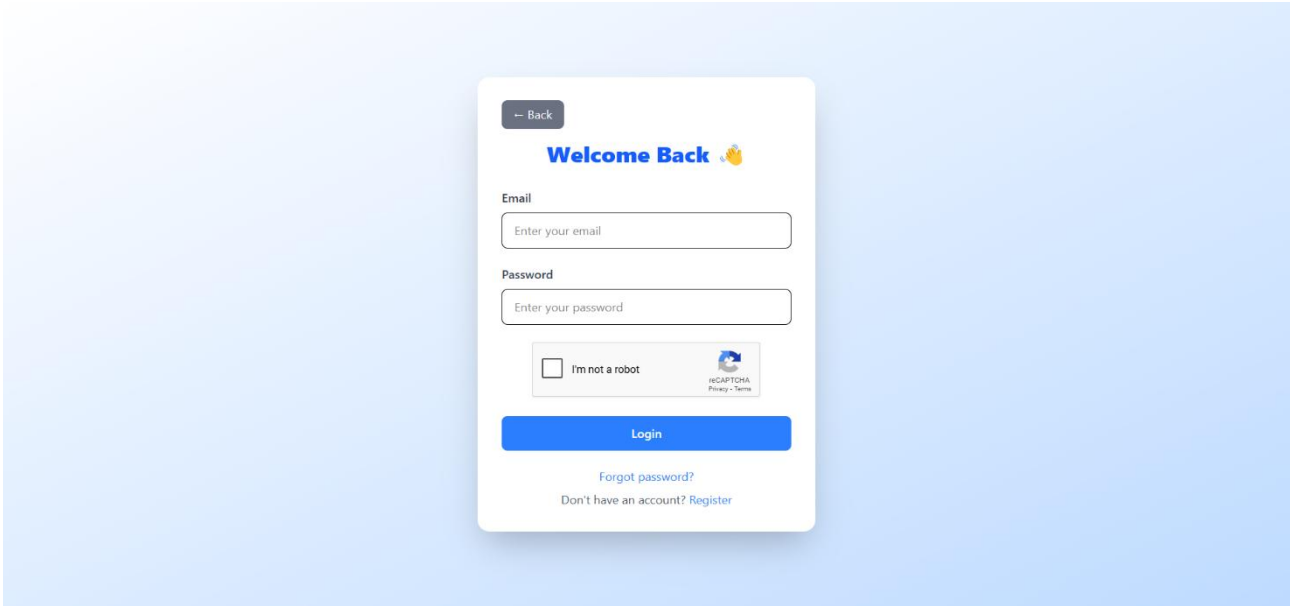

Figure A 1: Login Page

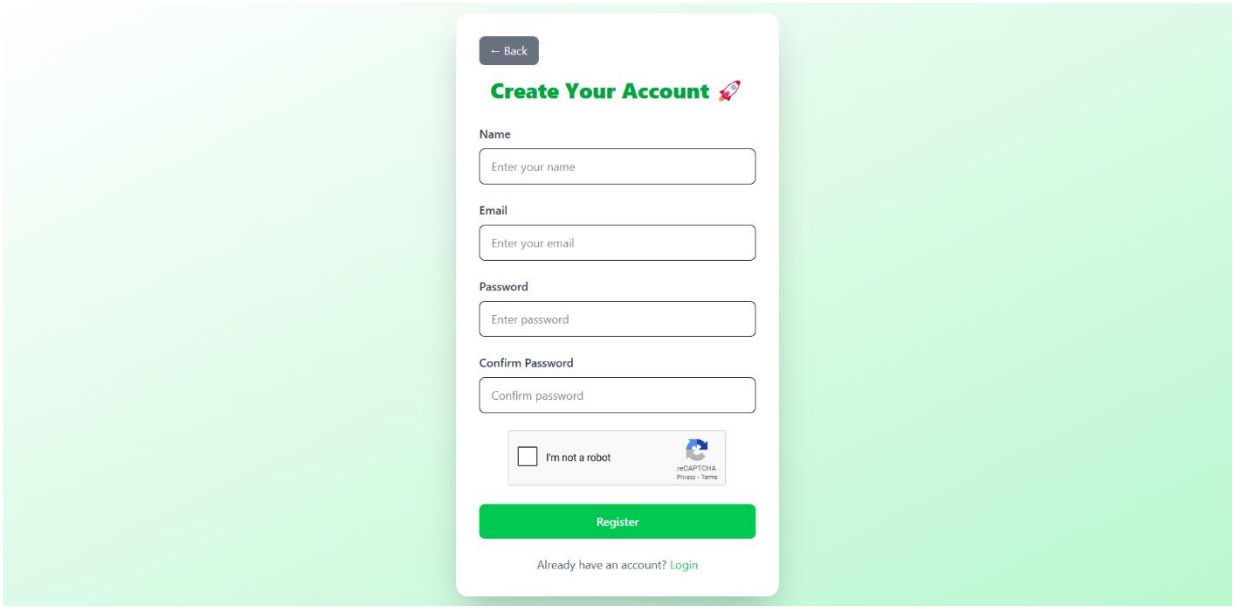

Figure A 2: Registration Page

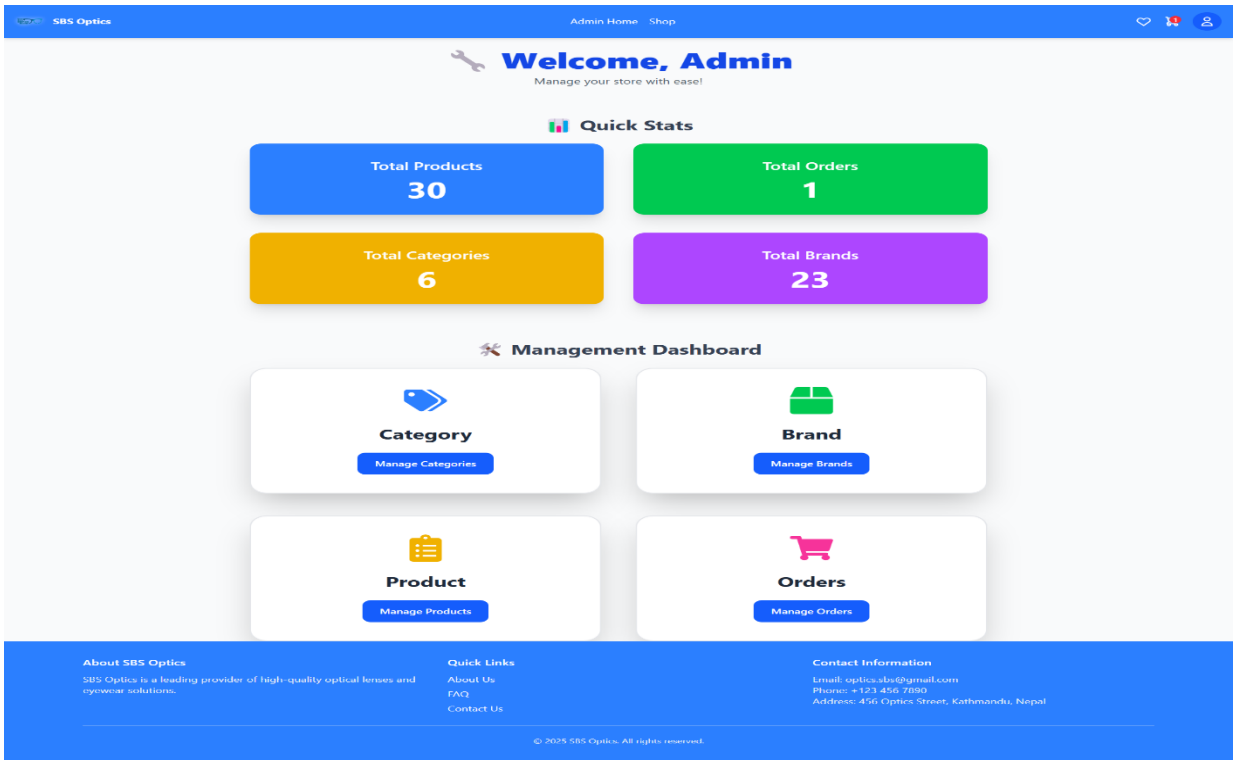

Figure A 3: Admin Page

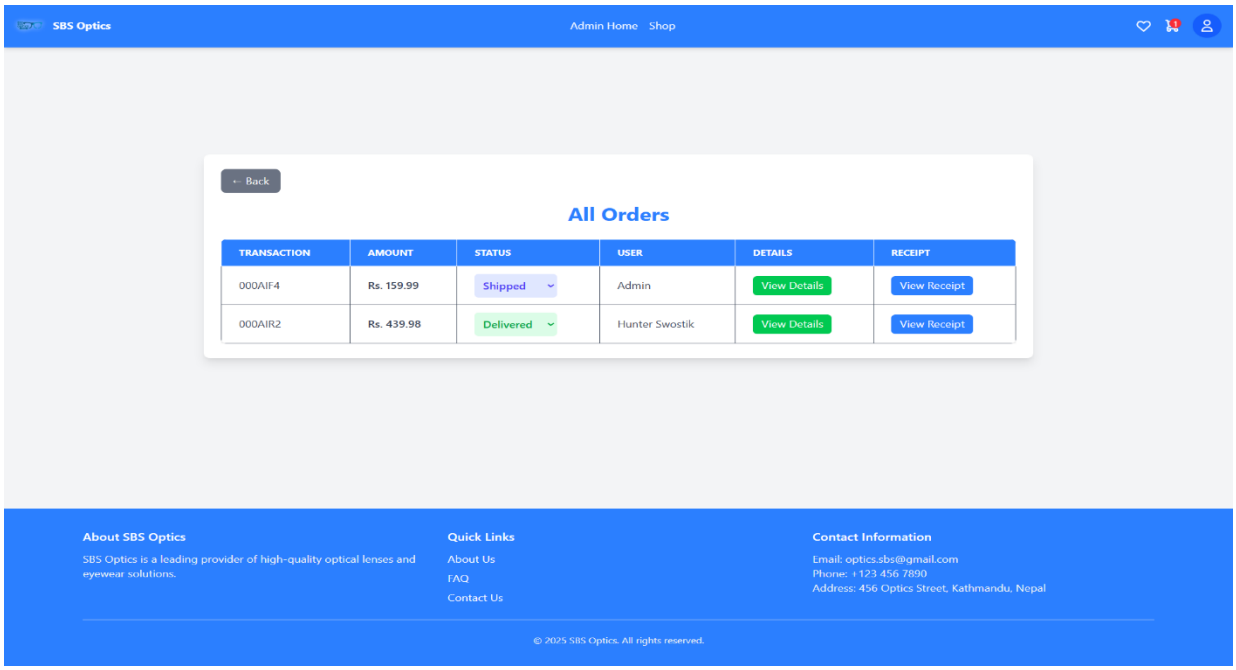

Figure A 4: Order management

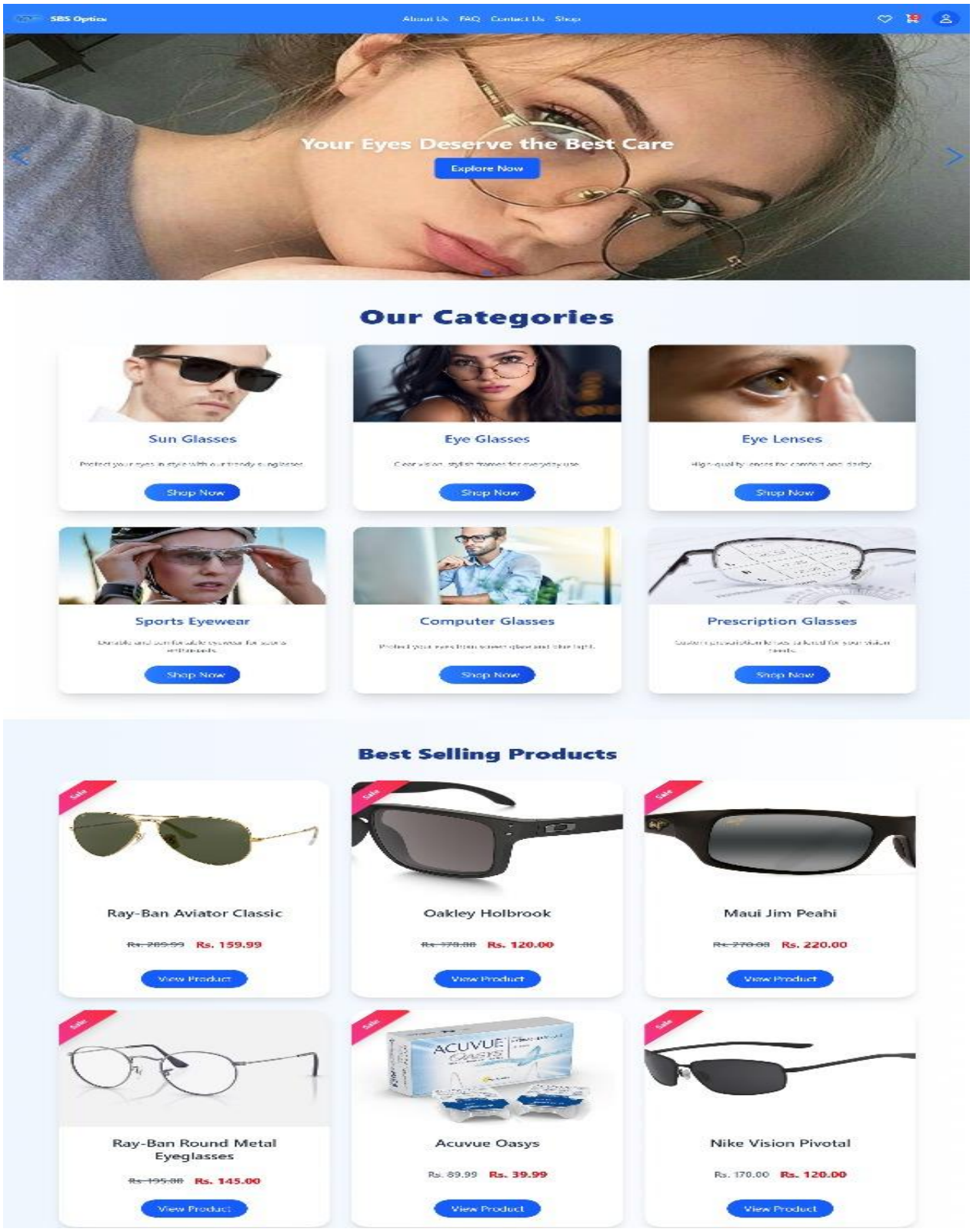

Figure A 5: Home Page

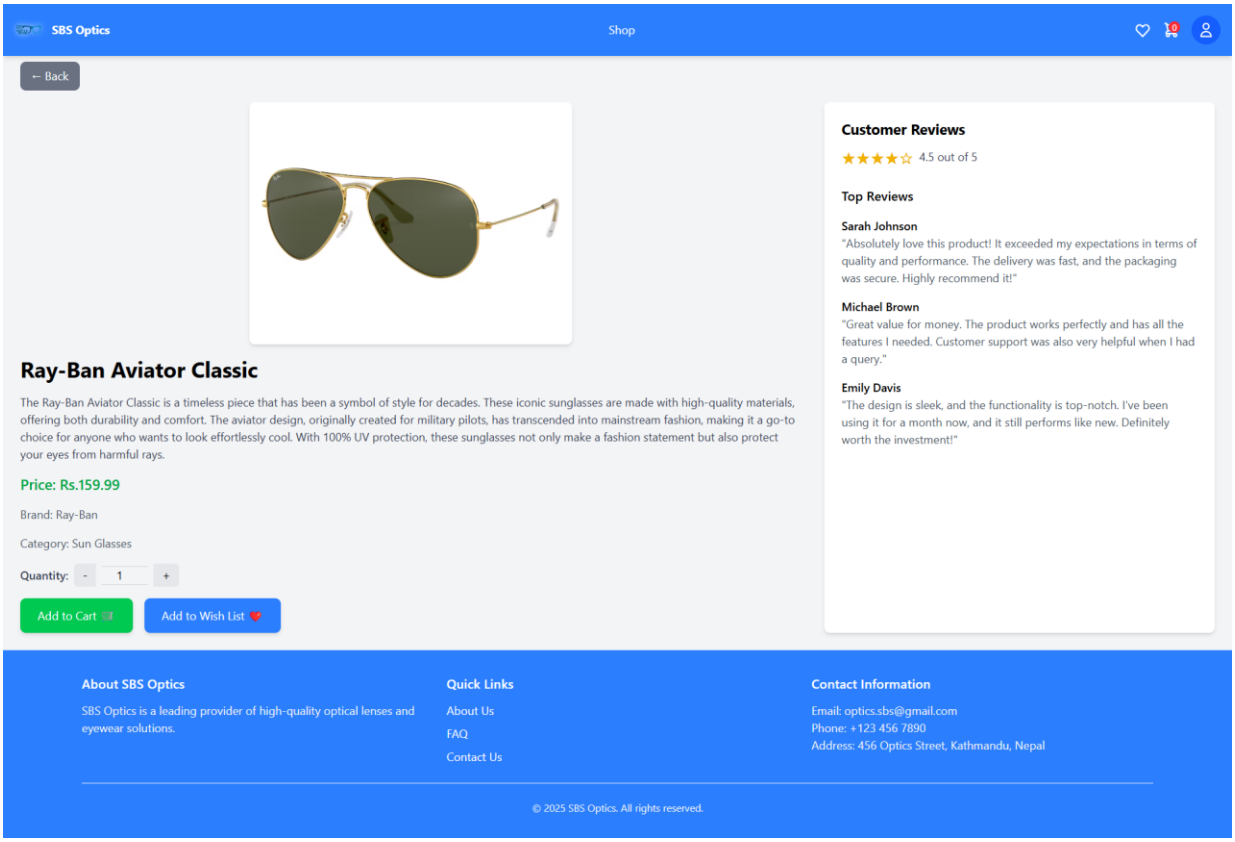

Figure A 6: Single Product Page

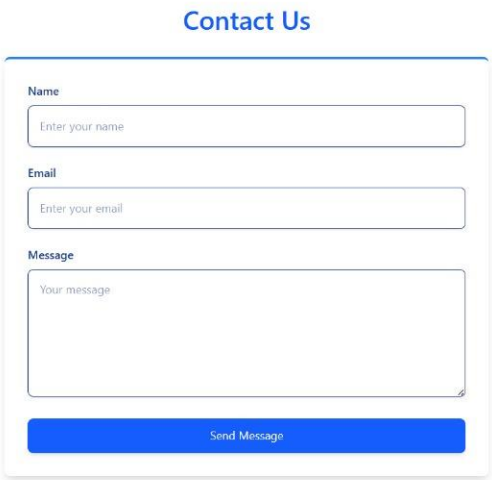

Figure A 7: Contact Us Page

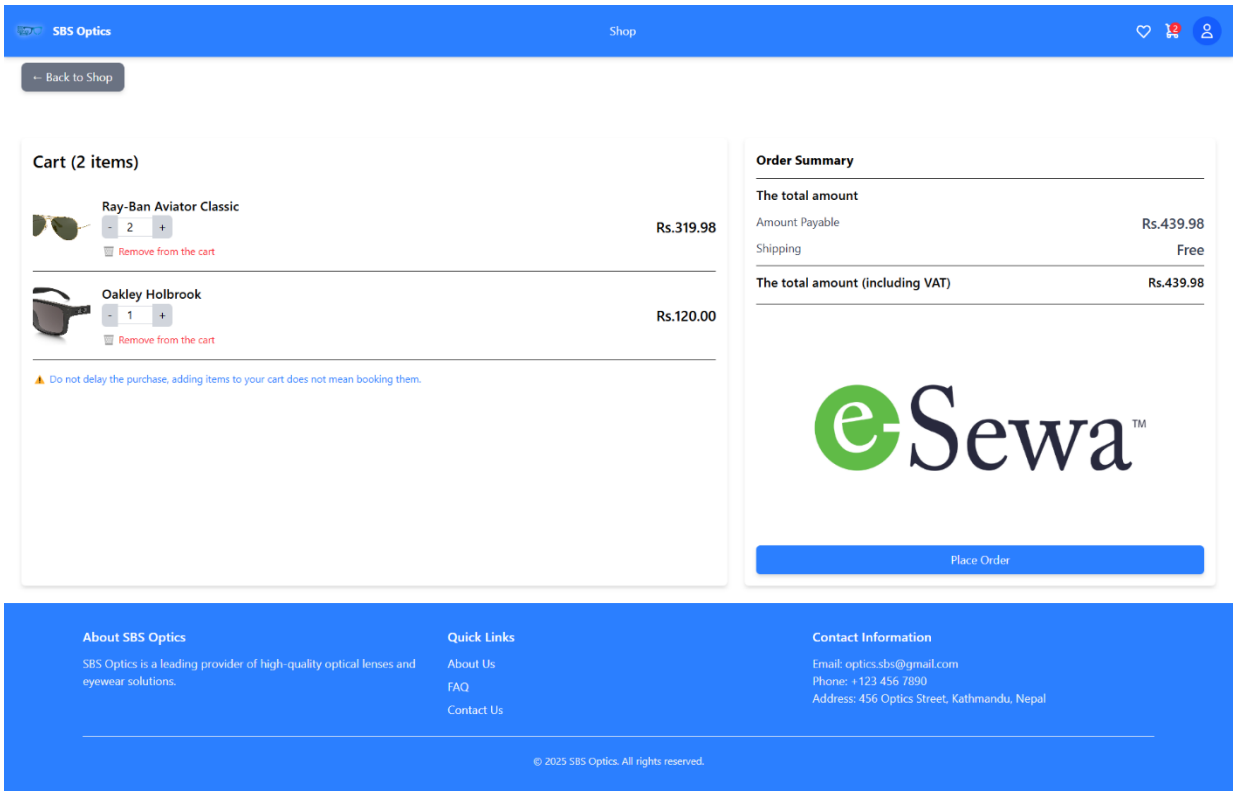

Figure A 8: Cart page