WHEEL WISE

21IT902 – ADVANCED APPLICATION DEVELOPMENT

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"WHEEL WISE"** is the bonafide work of **RAKESH P (727722EUCY035)** who carried out the project work under my supervision.

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ABSTRACT

Wheel Wise is an innovative online bike and accessories store designed to revolutionize the way cyclists shop for their biking needs. By leveraging advanced technologies and prioritizing user-centric design, Wheel Wise aims to provide a seamless, personalized, and comprehensive shopping experience that caters to the diverse preferences of modern cyclists.The platform offers an extensive range of bikes and accessories, including niche products tailored to specific cycling interests such as mountain biking, road cycling, and commuting. Through the integration of machine learning algorithms, Wheel Wise analyzes customer preferences, browsing history, and purchase behavior to offer personalized product recommendations, ensuring that each customer receives suggestions that align with their unique needs and interests.To enhance the overall shopping experience, Wheel Wise features an intuitive user interface with advanced search filters, detailed product descriptions, and secure checkout processes. The platform also incorporates real-time inventory management to prevent overselling and stockouts, providing customers with accurate information on product availability.Wheel Wise places a strong emphasis on quality customer support, offering multi-channel assistance through live chat, email, and phone. The platform's extensive FAQ section and self-service resources empower customers to find answers independently, while the knowledgeable support team ensures that inquiries are addressed promptly and effectively.By prioritizing accessibility and sustainability, Wheel Wise demonstrates its commitment to inclusivity and environmental responsibility. The platform incorporates features that cater to users with disabilities or mobility challenges, ensuring that every

customer can enjoy a seamless shopping experience. Additionally, Wheel Wise promotes sustainable biking practices by offering eco-friendly products and providing information on responsible cycling.Through its innovative approach, Wheel Wise aims to position itself as a leading destination for bike and accessories shopping, providing customers with a superior online experience that combines personalization, quality, and convenience. By continuously improving based on customer feedback and industry trends, Wheel Wise is poised to become a trusted partner for cyclists seeking to enhance their biking journeys.

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LIST OF ABBREVIATIONS

S. No	ABBREVIATIONS	EXPANSION
1	ADL	Activities of Daily Living
2	RAM	Random Access Memory
3	GB	Giga Bytes
4	VS	Visual Studio
5	OS	Operating System
6	HTTP	Hyper Text Transfer Protocol
7	JPA	Java Persistence API
8	API	Application Programming Interface
9	JDBC	Java Database Connectivity
10	SQL	Sequential Query Language
11	UI	User Interface
12	DOM	Document Object Model
13	JSX	Java Script XML
14	JWT	JSON Web Token
15	UML	Unified Modelling Language
16	DFD	Data Flow Diagram
17	FAQ	Frequently Asked Questions

CHAPTER 1
INTRODUCTION

1.1 OVERVIEW

Wheel wise is online bike and accessories dealership aims to provide a comprehensive solution for biking enthusiasts by offering a wide range of high-quality products and exceptional customer service. By leveraging the power of the internet, you can reach a broader customer base and offer a convenient shopping experience.

❖ Key Objectives :

- **Provide a diverse selection of bikes and accessories** to cater to the needs of casual riders, fitness enthusiasts, commuters, and adventure seekers.
- **Offer competitive pricing** by reducing middlemen and passing on the cost savings to customers.
- **Deliver a seamless and user-friendly shopping experience** through an intuitive website design and responsive customer support.
- **Build a strong brand reputation** as a trusted and reliable source for biking products and accessories.
- Target Audience
- Your target audience includes individuals who are passionate about biking and are looking for quality products and services. This includes:
- Casual riders seeking comfortable and stylish bikes for leisurely rides
- Fitness enthusiasts interested in high-performance bikes for training routines
- Commuters prioritizing efficient and eco-friendly transportation options
- Adventure seekers looking for off-road bikes and accessories

❖ Key Features :

- **Comprehensive product listings** covering a wide range of bikes and accessories
- **Fast and reliable shipping** to ensure prompt delivery of products
- **Personalized shopping experience** using AI and customer data to provide tailored recommendations
- **User-friendly website design** with intuitive navigation and detailed product information
- **Responsive customer support** to assist customers with any questions or concerns

1. Benefits to Customers

- **Wide selection of quality products** to choose from
- **Competitive pricing** due to reduced middlemen costs
- **Convenient and hassle-free shopping experience** through the online platform
- **Personalized recommendations** based on individual preferences and needs
- **Excellent customer service** to ensure satisfaction with purchases

1.2 COMPONENTS OF SYSTEM

Homepage Overview

The top navigation bar is a crucial element of your homepage, providing users with easy access to key functionalities and sections of your online store. It is prominently displayed at the top of the page and includes the following components:

1. **Logo**:
    1. Positioned on the left side, the logo serves as a visual representation of your brand. Clicking on the logo will redirect users back to the homepage, providing a consistent way to navigate.
2. **Sign In Button**:
    1. This button allows users to log into their accounts. When clicked, it opens a login form or redirects to a dedicated login page. If users do not have an account, they can easily find an option to register. This feature enhances user experience by allowing customers to access their profiles, view order history, and manage their preferences.
3. **Cart Button**:
    1. The cart button displays the number of items currently in the user's shopping cart, providing a quick overview of their selected products. Clicking this button takes users to the cart page, where they can review their items, adjust quantities, and proceed to checkout. This functionality is essential for facilitating a smooth purchasing process.

4. Bottom Navigation Bar :

1. **Bikes Button**:

    1. This button directs users to a dedicated section showcasing all available bikes. Users can browse through various categories, such as mountain bikes, road bikes, and hybrid bikes. The section may include filtering options to help users find bikes that match their preferences and needs.

2. **Accessories Button**:

    1. Similar to the bikes section, this button leads to a comprehensive collection of bike accessories. Users can explore a variety of products, including helmets, lights, locks, and apparel. This section ensures that customers can easily find the accessories they need to enhance their biking experience.

3. **Contact Button**:

    1. This button provides access to contact information, including customer service details, a contact form, and FAQs. It ensures that users can easily reach out for assistance or inquiries, fostering a supportive customer relationship.

1.3 ADVANCED TECHNOLOGIES

Advanced technologies are integral to enhancing the "Explore Epic" platform, improving user experience, and ensuring efficient, personalized travel planning and booking.

1. EmailJS for Seamless Communication

To enhance customer interaction and ensure efficient communication, we utilize Email JS to handle messages submitted through our "Contact Us" page.This powerful service allows us to receive emails directly from our customers in real-time, ensuring that inquiries, feedback, and support requests are addressed promptly.

How It Works: When a user fills out the contact form and submits their message, EmailJS captures the input data and sends it to our designated email address without requiring any server-side code. This integration allows us to streamline communication, ensuring that no message goes unnoticed and enabling us to provide timely responses to our customers.

Benefits: By using EmailJS, we can maintain a high level of customer service, build trust, and foster relationships with our users. This technology simplifies our communication process and enhances the overall customer experience.

2 Dynamic Pricing Algorithms

Our online store employs **dynamic pricing** technology to ensure that our pricing strategy remains competitive and responsive to market trends. This approach allows us to adjust prices in real-time based on various factors, such as demand, inventory levels, and competitor pricing.

How It Works: Our pricing algorithms analyze data from multiple sources, including sales trends and competitor prices, to determine the optimal price for each product. This means that customers can benefit from the best possible prices on bikes and accessories, ensuring that they receive value for their purchases.

Benefits: Dynamic pricing enables us to remain agile in a competitive market, attract more customers, and maximize sales opportunities. By offering competitive prices, we enhance customer satisfaction and loyalty, making our online store the go-to destination for biking enthusiasts.

3 Real-Time Order Tracking for Enhanced Transparency

To further improve the customer experience, we provide **real-time order tracking** capabilities.

This feature allows customers to monitor the status of their orders from the moment they are placed until they are delivered.

How It Works: Once an order is confirmed, customers receive a tracking number that they can use to check the status of their shipment. Our system updates the order status in real-time, providing customers with information about shipping progress, estimated delivery times, and any potential delays.

Benefits: Real-time order tracking enhances transparency and builds trust with our customers. By keeping them informed about their order status, we reduce anxiety and improve overall satisfaction. This feature also empowers customers to plan accordingly, knowing exactly when to expect their purchases.

CHAPTER 2

SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

The existing systems for online bike and accessories sales often present several challenges that impact both customers and retailers. While many platforms facilitate the buying and selling of bikes and accessories, they frequently lack the comprehensive features necessary to provide a seamless and efficient shopping experience. This overview will examine the limitations of current systems and highlight the need for an improved solution tailored to the needs of modern consumers.

Limitations of Existing Systems

1. **Fragmented User Experience**:
   Many online bike shops operate on separate platforms for inventory management, sales, and customer service. This fragmentation can lead to confusion and inefficiencies, as customers must navigate multiple sites or interfaces to complete their purchases. For instance, users may have to switch between different websites for product research, purchasing, and post-purchase support.
2. **Lack of Personalization**:
   Existing systems often provide generic recommendations based on limited user data. This lack of personalization results in a one-size-fits-all approach, where customers receive suggestions that may not align with their specific preferences or needs. As a result, users may miss out on products that would genuinely interest them.
3. **Inefficient Inventory Management**:
   Many current systems struggle with real-time inventory tracking, leading to issues such as overselling or stockouts. Retailers may not have accurate visibility into their stock levels, which can frustrate customers who expect immediate availability. This inefficiency can also hinder the retailer's ability to manage reorders effectively.
4. **Limited Accessibility Options**:
   Existing platforms often overlook the needs of customers with disabilities or mobility challenges. Without features that cater to these users, the online shopping experience can be exclusionary, preventing a significant segment of the market from accessing essential products and services.
5. **Insufficient Customer Support**:
   Customer support is often limited to email or chat options, which can lead to delays in response times. Many existing systems do not provide comprehensive FAQs or self-service options, resulting in a lack of immediate assistance for customers facing issues during their shopping. .

Current Market Solutions:

While there are some existing solutions that address certain aspects of online bike sales, they often fall short in providing a holistic approach. For example, systems like **Bikers Portal** and **Bike Store Management System** offer functionalities such as inventory tracking and online purchasing but may lack user-friendly interfaces or advanced personalization features.

1. **Bikers Portal** allows users to purchase bikes and parts online and includes features like bike service registration. However, it may not provide a fully integrated experience, as users still need to navigate through different sections for various services.
2. **Bike Store Management System** focuses on inventory management and sales tracking but may not prioritize user experience or accessibility, limiting its effectiveness in attracting a diverse customer base.

2.1.1 DRAWBACKS

1. Quality of Service

In the competitive landscape of online bike and accessories retail, providing exceptional quality of service is paramount to building customer loyalty and ensuring repeat business. Many existing platforms, such as Cycling Boutique and Doctor Garage, have set high standards by offering knowledgeable staff and expert advice, which significantly enhances the customer experience.

Key Aspects of Quality Service:

1. **Expert Guidance**: Customers often seek expert advice when purchasing bikes and accessories. Platforms that employ knowledgeable staff can provide personalized recommendations based on individual needs, preferences, and riding styles. This level of expertise not only helps customers make informed decisions but also fosters trust in the brand.
2. **Responsive Customer Support**: Effective customer support is crucial for addressing inquiries and resolving issues. Online stores that offer multiple channels of communication—such as live chat, email, and phone support—tend to have higher customer satisfaction rates. Quick response times and effective problem resolution are key indicators of quality service.

3. **After-Sales Support**: Quality service extends beyond the point of sale. Providing after-sales support, such as maintenance tips, warranty information, and easy return processes, enhances the overall customer experience. For instance, services like those offered by Doctor Garage, which include home pickup for bike servicing, exemplify how after-sales support can significantly improve customer satisfaction.

4. **User-Friendly Online Experience**: A seamless and intuitive website design contributes to the overall quality of service. Customers appreciate easy navigation, clear product descriptions, and straightforward checkout processes. Platforms that prioritize user experience are more likely to retain customers and encourage repeat purchases.

Importance of Quality Service

Investing in quality service not only enhances customer satisfaction but also differentiates your online store from competitors. Positive reviews and word-of-mouth referrals can significantly impact your brand's reputation, attracting new customers and fostering a loyal community of biking enthusiasts.

5. Limited Availability of Niche Experiences :

While many online bike retailers offer a broad range of products, there is often a gap in the availability of niche experiences that cater to specific interests within the cycling community. This limitation can hinder the ability of enthusiasts to find specialized products and services that enhance their biking experiences.

Challenges of Limited Availability :

5 **Niche Market Demand**: Cyclists often seek specialized products tailored to their unique needs, such as high-performance gear for competitive racing or eco-friendly accessories for sustainable biking. However, many existing platforms focus primarily on mainstream products, leaving niche markets underserved.

6 **Diverse Customer Needs**: Different segments of the cycling community—such as mountain bikers, road cyclists, and casual riders—have distinct preferences and requirements. Online stores that do not cater to these diverse needs may struggle to attract and retain customers who are looking for specific products or experiences.

7 **Limited Customization Options**: Many existing platforms offer limited customization for bike accessories and gear. Customers increasingly seek personalized options that allow them to express their individuality and enhance their biking experience. The absence of such options can lead to dissatisfaction and a sense of disconnect from the brand.

Addressing Niche Experience Gaps :

To capitalize on the demand for niche experiences, your online bike and accessories store can implement several strategies:

8 **Curated Collections**: Create curated collections of products that cater to specific cycling interests, such as adventure biking, urban commuting, or eco-friendly cycling. This approach not only showcases your understanding of customer needs but also helps users easily find relevant products.

9 **Partnerships with Specialized Brands**: Collaborate with niche brands that offer unique products not commonly found in mainstream stores. By providing access to these specialized items, you can attract a broader audience and enhance your product offerings.

10 **Community Engagement**: Foster a sense of community by hosting events, workshops, or online forums where cyclists can share experiences, tips, and recommendations. Engaging with your customer base in this way can help identify niche interests and inform your product selection.

11 **Personalization Features**: Implement features that allow customers to customize their products, such as selecting colors, sizes, and accessories. This not only enhances the shopping experience but also caters to the desire for individuality among cyclists.

2.2 PROBLEM DEFINITION

1 Quality of Service

The quality of services offered by "Explore Epic" can be inconsistent due to variations in the standards of local tour operators, accommodations, and guided experiences. These inconsistencies may lead to dissatisfaction among users and affect the overall travel experience.

2 Limited Availability of Niche Experiences

"Explore Epic" may not provide access to all niche travel experiences or specific destinations that some users are looking for, which could lead to inconvenience and require users to search for alternative platforms or services.

2.3 PROPOSED SYSTEM

The proposed system for Wheel Wise aims to revolutionize the online shopping experience for bikes and accessories by addressing the limitations of existing platforms. By integrating advanced technologies and focusing on user-centric design, the new system will provide a seamless, personalized, and comprehensive shopping experience tailored to the diverse needs of modern cyclists.

1. **Personalized Recommendations**:

   The proposed system will utilize advanced algorithms and machine learning to analyze user preferences, browsing history, and purchase behavior. This data will enable the platform to provide personalized product recommendations, ensuring that each customer receives suggestions that align with their specific interests and needs.

2. **Enhanced User Experience**:

   The user interface will be designed to be intuitive and easy to navigate, allowing customers to find and purchase products quickly. Features such as advanced search filters, product comparisons, and detailed descriptions will enhance the shopping experience, making it more enjoyable and efficient.

3. **Comprehensive Product Range**:

   Wheel Wise will offer a wide array of bikes and accessories, including niche products that cater to specific cycling interests. By collaborating with specialized brands and curating collections for various cycling styles (e.g., mountain biking, road cycling, commuting), the platform will ensure that all customer needs are met.

4. **Quality Customer Support**:

   The proposed system will implement a multi-channel customer support strategy, including live chat, email, and phone support. This will enable customers to receive timely assistance and expert advice, enhancing their overall experience. Additionally, an extensive FAQ section and self-service resources will empower customers to find answers independently.

5. **Real-Time Inventory Management**:

   1. To prevent issues related to overselling and stockouts, the system

willincorporate real-time inventory tracking. This feature will provide accurate information on product availability, allowing customers to make informed purchasing decisions and ensuring a smooth shopping experience.

6. **Dynamic Pricing Model**:

The proposed system will utilize a dynamic pricing model that adjusts prices based on demand, inventory levels, and competitor pricing. This approach will enable Wheel Wise to offer competitive prices while maximizing profitability.

7. **Accessibility Features**:

The platform will prioritize accessibility by incorporating features that cater to users with disabilities or mobility challenges. This includes wheelchair-friendly product options, easy navigation, and compatibility with assistive technologies, ensuring that every customer can enjoy a seamless shopping experience.

8. **Sustainable Practices**:

Wheel Wise will promote sustainable and responsible travel practices by offering eco-friendly products and highlighting options that minimize environmental impact. The platform will also provide information on sustainable biking practices and encourage customers to make environmentally conscious choices.

9. **Community Engagement**:

The proposed system will foster a sense of community among cyclists by hosting forums, blogs, and events where users can share experiences, tips, and recommendations. This engagement will help build a loyal customer base and enhance brand loyalty.

10. **Feedback and Continuous Improvement**:

The system will include features for collecting user feedback on products and services. This valuable input will be used to refine and improve the platform continually, ensuring that it meets the evolving needs and expectations of customers.

2.3.1 ADVANTAGES

Personalized Shopping Experience :

Wheel Wise utilizes advanced algorithms to analyze user preferences and provide personalized product recommendations. This ensures that customers receive suggestions tailored to their specific interests and needs.

Wide Selection of Bikes and Accessories:

The platform offers a comprehensive range of bikes and accessories, including niche products that cater to various cycling styles like mountain biking, road cycling, and commuting. This wide selection caters to the diverse needs of cyclists.

Competitive Pricing :

As an online retailer, Wheel Wise can offer better prices compared to brick-and-mortar stores due to lower overhead costs. Online retailers also often have sales and promotions to help customers save money.

Convenient Shopping

Customers can browse and purchase bikes and accessories from the comfort of their homes. Online shopping provides the convenience of comparing prices and features without visiting multiple physical stores.

Extensive Product Information :

Detailed product descriptions, images, and customer reviews help customers make informed purchasing decisions. This transparency builds trust and confidence in the brand.

Accessibility Features :

Wheel Wise prioritizes accessibility by incorporating features that cater to users with disabilities or mobility challenges. This includes wheelchair-friendly options and compatibility with assistive technologies.

Sustainable Practices :

- The platform promotes sustainable biking by offering eco-friendly products and providing information on responsible cycling practices. This appeals to customers who prioritize environmental consciousness.

CHAPTER 3

SYSTEM REQUIREMENTS

The hardware and software requirements and also the platform description of the system are explained under sections 3.1, 3.2 and 3.3 respectively.

3.1HARDWARE REQUIREMENTS

1. Processor Type : Ryzen i5
2. RAM : 8GB RAM
3. Hard Disk : 512GB

3.2 SOFTWARE REQUIREMENTS

1. Operating system : Windows 11
2. Front End, Back End : Visual studio code
3. Coding Language : ReactJs, Java

3.3 SOFTWARE DESCRIPTION

Fig. 3.1. VS Code Logo

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft, it can be used to work with Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, embedded Git.Users can change the theme, keyboard shortcuts, preferences, and install extensions thatadd functionality.

3.3.1 FRONTEND

ReactJs

ReactJS is a popular JavaScript library for building user interfaces, particularly for web applications. React follows a component-based architecture, where UIs are broken down into reusable components. Each component encapsulates its own logic and UI making it easier to manage and maintain complex user interfaces. React uses a virtual DOM (Document Object Model) to improve performance. Instead of directly manipulating the DOM, React creates a virtual representation of the DOM in memory and updates it efficiently. When changes occur, React compares the virtual DOM with the actual DOM and only updates the necessary parts, reducing the number of DOM manipulations and improving performance.

React uses JSX, a syntax extension that allows developers to write HTML-like code within JavaScript. JSX makes it easier to write and understand React components, as it closely resembles the final UI structure. React follows a unidirectional data flow, also known as one-way data binding. Data flows from parent components to child components via props, and child components can communicate with parent components via callbacks. This helps maintain a clear and predictable data flow in the application.

Features of ReactJs

1. **Declarative**

   React makes it easy to create interactive UIs by using a declarative programming approach. Developers can describe how the UI should look based on the application state.

2. Component-Based

React uses a component-based architecture, where UIs are composed of reusable and self-contained components. This makes it easier to manage and maintain complex UIs, as each component can be developed, tested, and updated independently.

3. Virtual DOM

React uses a virtual DOM (Document Object Model) to improve performance. Instead of updating the entire DOM when the state changes, React compares the virtual DOM with the actual DOM and only updates the parts that have changed.

4. JSX

JSX is a syntax extension for JavaScript that allows developers to write HTML-like code within their JavaScript code. This makes it easier to create and manage UI components, as JSX code can be more readable.

5. Unidirectional Data Flow

React follows a unidirectional data flow, from parent components to child components. This helps to maintain the consistency of the application state and understand the data flow in the application.

6. React Native

React Native is a framework for building native mobile applications using React. It allows developers to use the same codebase to build both iOS and Android applications, saving time and effort in development.

7. Community and Ecosystem

React has a large and active community of developers, which has led to the development of a rich ecosystem of libraries, tools, and resources that can be used to enhance and extend React applications.

3.3.2 BACKEND

Java

Java is a versatile, object-oriented programming language renowned for its platform independence, security, and portability. Java is a high-level, general-purpose programming language that is widely used for developing a variety of applications. Java is object-oriented, emphasizing the use of classes and objects for organizing code and data.

It boasts a comprehensive standard library with built-in classes and APIs for various tasks, from data manipulation to networking. Java enforces strong type checking, enhancing code reliability and reducing runtime errors. The language includes automatic memory management through garbage collection, simplifying memory allocation and deallocation.

The extensions used to develop my backend part of the project are,

1. **Spring Boot Extension Pack by VMware**

   This extension pack provides a set of tools and features to enhance your development experience with Spring Boot, including code snippets, syntax highlighting, and project templates.

2. **Extension Pack for Java by Microsoft**

   This extension pack includes essential tools for Java developers, such as debugging support, code navigation, and IntelliSense for Java files.

3. **Spring Boot Snippets by Developer Soapbox**

   This extension provides a collection of code snippets for commonly used Spring Boot annotations and configurations, helping you write code more efficiently.

Dependencies used to build my project are,

1. **Spring Web**

   This dependency provides the necessary components for building web applications with Spring, including controllers, request mappings, and HTTP message converters.

2. **Dev Tools**

   Spring Boot DevTools provides a set of tools to improve the development experience, including automatic application restarts, live reload, and enhanced debugging capabilities.

3. **Data JPA**

   Spring Data JPA provides support for easily working with JPA (Java Persistence API) repositories, simplifying the implementation of data access logic in your application.

4. **Postgres Driver**

   This dependency provides the JDBC driver for PostgreSQL, allowing your Spring Boot application to connect to a PostgreSQL database.

5. **Lombok**

   Lombok is a library that helps reduce boilerplate code in Java classes by automatically generating getters, setters, and other repetitive code based on annotations.

6. **Spring Security Web**

   This dependency provides support for securing your web application using Spring Security, including authentication and authorization mechanisms.

CHAPTER 4

SYSTEM DESIGN

4.1 MODULE DESCRIPTION

1. User management
2. Test Drive management
3. Contact Us management
4. Cart management

4.1.1 USER MANAGEMENT

The User Management module handles all aspects of user data and profile management within the "Wheel Wise" application. This includes user registration, authentication, profile updates, and managing user roles and permissions. Ensuring secure and efficient management of user data is critical for the system's overall functionality.

Table 4.1. User Management

	id	email	password	username
▶	1	trailrakesh@gmail.com	123456	Rakesh
	2	NULL	123456	Raj
	3	sabrin@gmail.com	234567	sabrin
	4	karthi@gmail.com	1234567	karthi

4.1.2 TEST DRIVE MANAGEMENT

At Wheel Wise, we understand that purchasing a bike is a significant investment, and customers want to ensure they make the right choice. To address this need, we have implemented a comprehensive Test Drive Management system that allows customers to experience bikes firsthand before making a purchase.

Streamlined Test Drive Booking :

Customers can easily book test drives through our user-friendly website. By providing

their location, preferred bike model, and desired time slot, customers can conveniently schedule a test ride at their nearest Wheel Wise showroom or partner location.

Extensive Bike Selection :

Our Test Drive Management system offers a wide range of bike models from various brands, ensuring that customers can find the perfect fit for their riding style and preferences. Whether they are interested in road bikes, mountain bikes, or hybrid models, customers can test multiple options to make an informed decision.

Personalized Assistance :

During the test drive, customers will be assisted by our knowledgeable staff who can provide expert guidance and answer any questions. Our team is trained to help customers adjust the bike settings, provide tips on proper riding technique, and offer recommendations based on the customer's feedback and performance during the test ride.

Convenient Locations :

To make test drives accessible to as many customers as possible, we have partnered with various bike shops and showrooms across the country. Customers can choose a location that is convenient for them, ensuring a seamless and hassle-free test drive experience.

Feedback and Recommendations :

After the test drive, customers can provide feedback on their experience through our online platform. This valuable information helps us improve our offerings and ensure that we continue to meet the evolving needs of our customers. Based on the customer's feedback and preferences, our system will provide personalized recommendations for the most suitable bike models and accessories.

Secure Bike Reservations :

If a customer decides to purchase the bike after the test drive, they can easily reserve the

model through our online platform. Our system will hold the bike for a specified period, allowing customers to complete their purchase at their convenience.

Advantages of Test Drive Management :

- Builds customer confidence in their purchasing decision
- Reduces the risk of buyer's remorse and returns
- Enhances the overall buying experience and customer satisfaction
- Provides valuable data for improving product recommendations and inventory management
- Fosters a sense of trust and transparency between the brand and customers.

Table 4.2. Test Drive Management

id	comments	date	email	full_name	phone_number
1	To Testdrive Shot Gun 650	2024-08-31	abc@gmail.com	Abc	0000000009
2	To Testdrive Shot Gun 650	2024-08-31	abcd@gmail.com	Abcd	0000000009
3	To Testdrive Meteor 350	2024-08-31	abcde@gmail.com	Abcde	0000000009
4	To Testdrive Classic 350	2024-08-31	abc@gmail.com	Abc	0000000009
5	To Testdrive Classic 350	2024-08-31	qwer@gmail.com	qwer	0000000009
6	To Testdrive Classic 350	2024-08-31	qwert@gmail.com	qwert	0000000009
NULL	NULL	NULL	NULL	NULL	NULL

4.1.3 CONTACT US MANAGEMENT

At Wheel Wise, we prioritize delivering exceptional customer service and ensuring that all inquiries and concerns are addressed promptly. Our Contact Us Management system, powered by EmailJS, enables us to efficiently handle customer communications and provide responsive support.

User-Friendly Contact Form

Our website features a simple and intuitive Contact Us form, allowing customers to easily submit their inquiries. The form includes fields for the customer's name, email address, subject, and message, ensuring that we have all the necessary information to address their concerns effectively.

EmailJS Integration

To streamline the process of receiving and responding to customer inquiries, we have integrated EmailJS into our Contact Us Management system. EmailJS is a powerful tool

that enables us to send form submissions directly to our email inboxes without the need for server-side code.

Instant Email Notifications

As soon as a customer submits the Contact Us form, EmailJS instantly sends an email notification to our designated support team. This real-time alert ensures that we are aware of the inquiry and can begin working on a response immediately.

Efficient Response Times

Our dedicated support team is committed to providing timely responses to all customer inquiries. We strive to acknowledge all messages within 24 hours and resolve issues as quickly as possible. By prioritizing responsive support, we demonstrate our commitment to customer satisfaction and build trust in the Wheel Wise brand.

Comprehensive Knowledge Base

To complement our Contact Us Management system, we have created a comprehensive Knowledge Base on our website. This resource includes detailed FAQs, troubleshooting guides, and helpful articles on various topics related to bikes and accessories. By empowering customers to find answers independently, we can reduce the number of inquiries and provide more efficient support.

Continuous Improvement

We regularly monitor and analyze the inquiries received through our Contact Us form to identify areas for improvement. This data helps us enhance our Knowledge Base, update our product information, and refine our support processes to better meet the needs of our customers.

Advantages of Contact Us Management with EmailJS

1. Streamlines the process of receiving and responding to customer inquiries
2. Enables real-time email notifications for prompt attention to customer concerns
3. Demonstrates a commitment to responsive support and customer satisfaction
4. Reduces the workload on the support team by providing a Knowledge Base for self-service
5. Provides valuable data for improving products, services, and support processes

By implementing a robust Contact Us Management system powered by EmailJS, Wheel Wise ensures that every customer inquiry is handled efficiently and effectively. This commitment to responsive support enhances the overall customer experience and contributes to the growth and success of our online bike and accessories store.

Table 4.3 CONTACT US MANAGEMENT

id	email	first_name	last_name	message	mobile
1	rakeshraman540@gmail.com	RAKESH	P	gfcgh ghg	09487802749
2	sabrin@gmail.com	sabrin	s	hello	6382406464
3	abce@gmail.com	abc	d	Exhaust Spare for old classic 350 no avaiable o...	0000000000
4	abce@gmail.com	abc	d	Exhaust Spare for old classic 350 no avaiable o...	0000000000
5	abce@gmail.com	abc	d	Exhaust Spare for old classic 350 no avaiable o...	0000000000
6	qwert@gmail.com	qwert	d	Exhaust Spare for old classic 350 no avaiable o...	0000000000
7	rakeshraman540@gmail.com	RAKESH	P	gvhnni	09487802749

4.1.4 CART MANAGEMENT

Wheel Wise, we recognize that an efficient cart management system is crucial for enhancing the online shopping experience. Our Cart Management feature is designed to provide customers with a seamless and user-friendly interface for managing their selected products before completing their purchase.

1. **Easy Add and Remove Functionality**:
    1. Customers can effortlessly add items to their cart with a single click. If they change their mind, removing items is just as simple, allowing for a hassle-free shopping experience.
2. **Real-Time Cart Updates**:
    1. The cart updates in real-time as customers add or remove products, ensuring they always have an accurate view of their selections and total costs. This transparency helps customers keep track of their spending while they shop.
3. **Persistent Cart**:
    1. Our system offers a persistent cart feature that saves customers' selections even if they leave the site and return later. This allows users to continue their shopping journey without losing their previously selected items, enhancing convenience and encouraging conversions.
4. **Detailed Product Overview**:
    1. Each item in the cart is accompanied by a detailed overview, including product images, descriptions, prices, and available quantities. This information helps customers review their choices and make adjustments as needed.
5. **Discounts and Promotions**:
    1. The cart management system automatically applies any applicable

discounts or promotions, ensuring that customers receive the best possible price on their selected items. This feature enhances customer satisfaction and encourages purchases.

6. **Secure Checkout Process**:

    1. Once customers are ready to complete their purchase, our cart management system guides them through a secure and straightforward checkout process. Users can easily enter shipping information, select payment methods, and review their order before finalizing the transaction.

7. **Guest Checkout Option**:

    1. To enhance accessibility, we offer a guest checkout option that allows users to complete their purchase without creating an account. This feature caters to customers who prefer a quick and hassle-free shopping experience.

8. **Cart Notifications**:

    1. Customers receive notifications for items that are low in stock or on sale, encouraging them to make timely purchasing decisions. This proactive approach helps prevent missed opportunities and enhances the shopping experience.

9. Benefits of Effective Cart Management :

1. **Improved User Experience**: A well-designed cart management system simplifies the shopping process, making it easier for customers to find, manage, and purchase products.

2. **Increased Conversion Rates**: By providing a seamless checkout experience and addressing potential barriers, effective cart management can lead to higher conversion rates and reduced cart abandonment.

3. **Enhanced Customer Satisfaction**: Features like persistent carts and real-time updates contribute to a positive shopping experience, fostering customer loyalty and encouraging repeat business.

4. **Data Insights**: Cart management provides valuable data on customer preferences and purchasing behavior, which can be used to refine marketing strategies and improve product offerings.

Table 4.4. Cart Management

	id	customer_id	created_at	status
▶	1	1	2024-08-13 10:30:00	active
	2	2	2024-08-13 11:00:00	pending
	3	3	2024-08-13 11:30:00	completed
*	NULL	NULL	NULL	NULL

4.2 USE CASE DIAGRAM

A Use Case Diagram provides a visual representation of the interactions between users (actors) and the "Wheel Wise system. It illustrates the various functionalities that the system offers and how users can engage with those functionalities. The diagram helps in understanding the system's capabilities and the different roles involved.

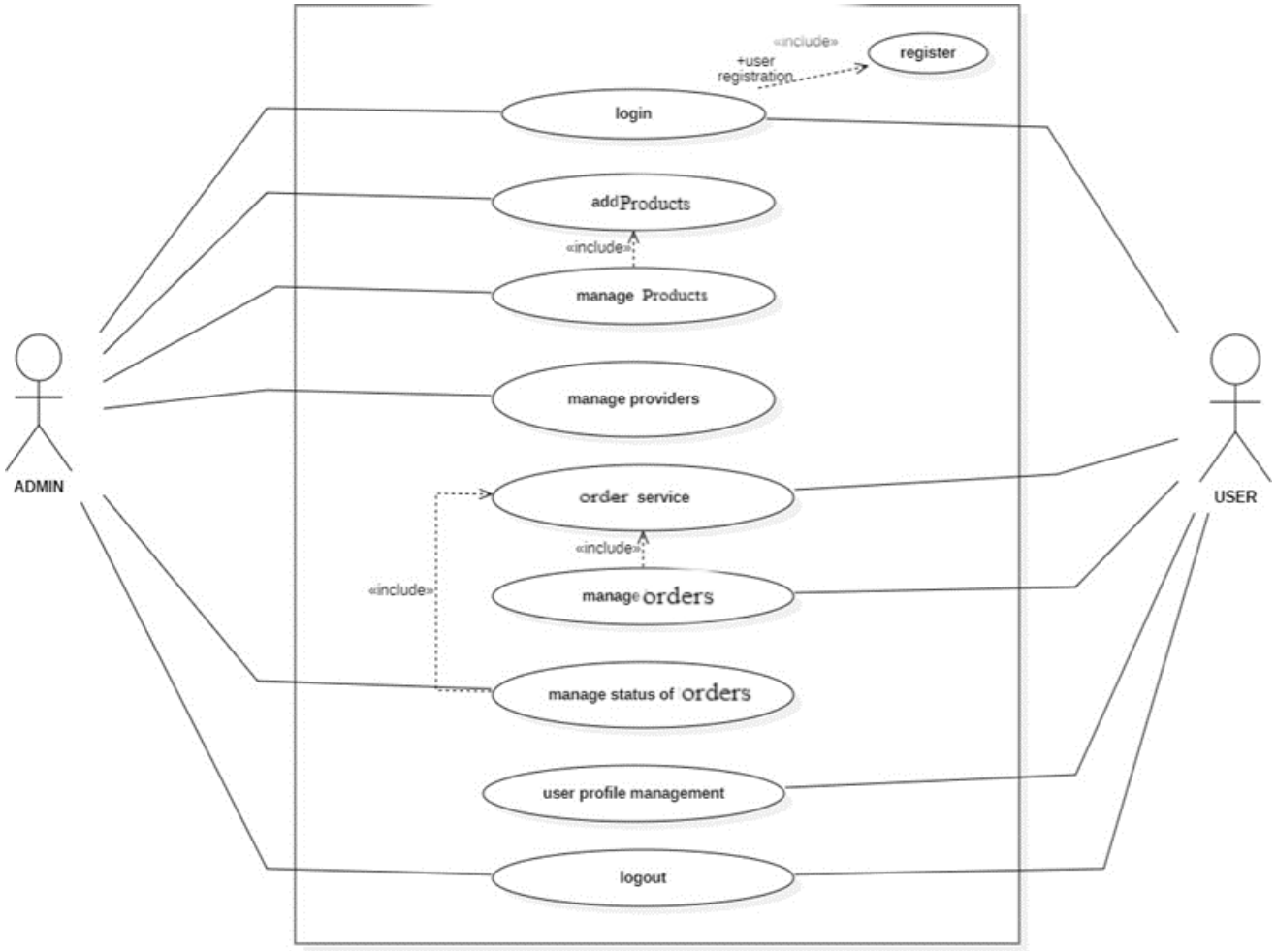

Fig. 4.1. Use Case Diagram

4.3 SEQUENCE DIAGRAM

A Sequence Diagram showcases the interactions between different components or objects within the "Explore Epic" system over time. It captures the sequence of messages exchanged between entities to perform specific tasks

or functionalities. This diagram helps in understanding the dynamic behavior of the system.

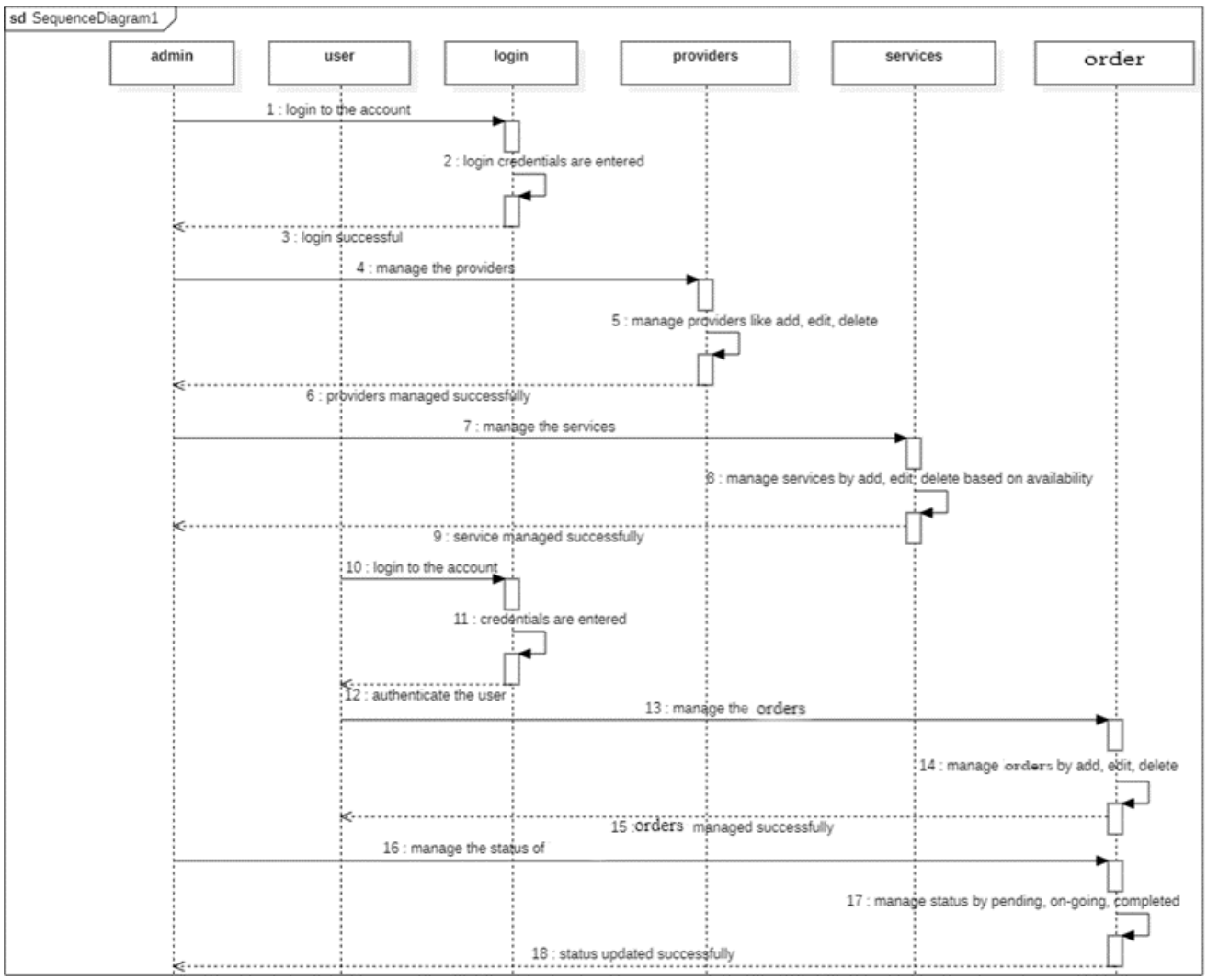

Fig. 4.2. Sequence Diagram

4.4 DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) visualizes the flow of data within the "Explore Epic" system. It depicts how data is input, processed, and output while emphasizing the relationships and interactions between various system components. The DFD is crucial for analyzing, designing, and documenting the information flow within the system.

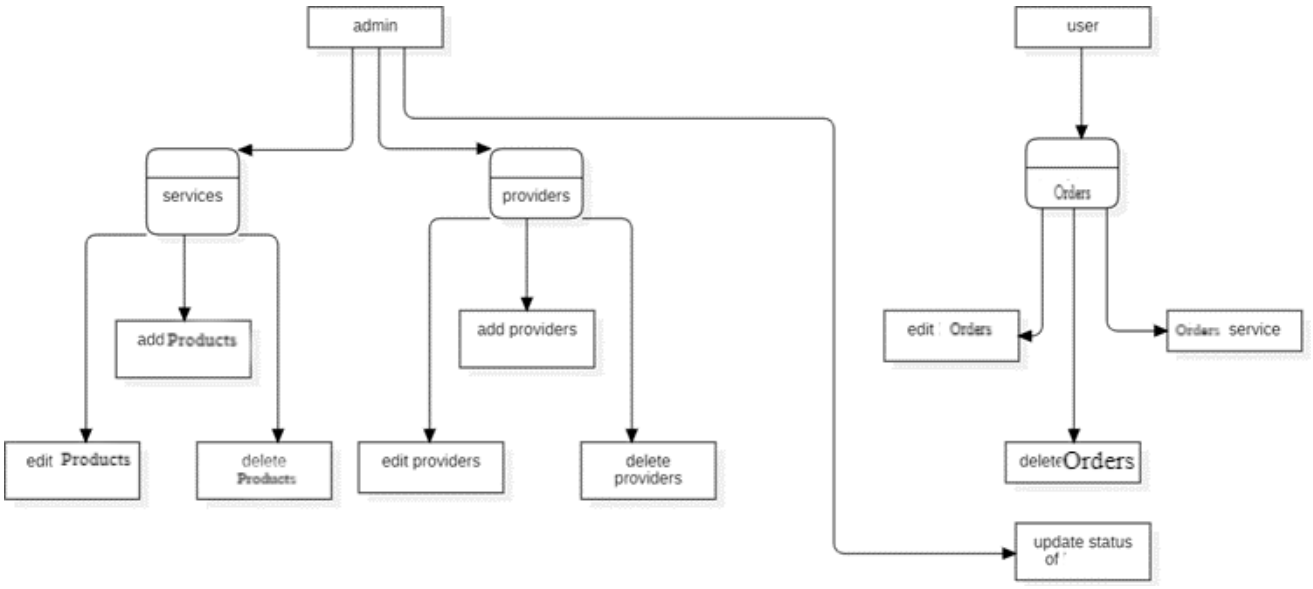

Fig. 4.3. Data Flow Diagram

CHAPTER 5

TESTING

5.1 UNIT TESTING

Unit testing is a crucial phase in the software development lifecycle that involves testing individual components or modules of the application to ensure they function correctly. For Wheel Wise, unit testing will help identify bugs early, improve code quality, and ensure that each part of the system operates as intended.

Objectives of Unit Testing

- **Validate Functionality**: Ensure that each unit of code performs its intended function correctly.
- **Identify Bugs Early**: Detect and fix issues at an early stage, reducing the cost and effort of fixing bugs later in the development process.
- **Facilitate Code Changes**: Allow developers to make changes and refactor code with confidence, knowing that existing functionality is covered by tests.
- **Improve Code Quality**: Encourage better design practices and code maintainability by ensuring that each unit is thoroughly tested.

1. **User Registration and Authentication**:
    - Test the registration process, including validation of user input (e.g., email format, password strength).
    - Verify that users can log in and log out successfully.
    - Ensure that password recovery and reset functionalities work as expected.
2. **Product Management**:
    - Test the functionality for adding, updating, and deleting products in the inventory.
    - Verify that product details (e.g., name, description, price) are correctly displayed.
    - Ensure that inventory levels are updated correctly after purchases.
3. **Shopping Cart Functionality**:
    - Test adding and removing items from the cart.
    - Verify that the cart accurately calculates total prices and discounts.
    - Ensure that the cart persists items for returning users.
4. **Checkout Process**:

- Test the entire checkout flow, including payment processing and order confirmation.
- Verify that users receive appropriate notifications for successful or failed transactions.
- Ensure that order details are correctly recorded in the database.

5. **Search and Filtering**:
    - Test the search functionality to ensure it returns accurate results based on user queries.
    - Verify that filters (e.g., category, price range) work correctly and refine search results as expected.
6. **Customer Support Features**:
    - Test the functionality of the Contact Us form, ensuring that submissions are sent correctly via EmailJS.
    - Verify that customer inquiries are logged and can be retrieved by support staff.
7. **Feedback and Reviews**:
    - Test the process of submitting product reviews and feedback.
    - Verify that reviews are displayed correctly on product pages.

5.2 INTEGRATION TESTING

Integration testing for the Wheel Wise project focuses on ensuring seamless interactions and interfaces between different components of the system. The goal is to validate that API endpoints responsible for data exchange between the front-end and back-end work harmoniously together. This phase ensures accurate data flow and cooperation among components, ultimately validating the overall functionality of the online bike and accessories store. Integration testing verifies that various modules, such as product management, shopping cart, and checkout, work together effectively to provide a smooth and efficient shopping experience for customers.

1. SECURITY AND AUTHENTICATION

Integration testing for the Wheel Wise project focuses on ensuring seamless interactions and interfaces between different components of the system. The goal is to validate that

API endpoints responsible for data exchange between the front-end and back-end work harmoniously together. This phase ensures accurate data flow and cooperation among components, ultimately validating the overall functionality of the online bike and accessories store. Integration testing verifies that various modules, such as product management, shopping cart, and checkout, work together effectively to provide a smooth and efficient shopping experience for customers.

2. TEST CASS

Test cases are crucial for evaluating the Wheel Wise project's functionality, including the user registration and authentication process, product management, shopping cart functionality, and checkout process. They are essential for thorough testing, identifying issues, and ensuring quality assurance. By creating comprehensive test cases, the development team can validate that each component of the online bike and accessories store operates as intended, providing a seamless and reliable shopping experience for customers.

1. TEST CASE I

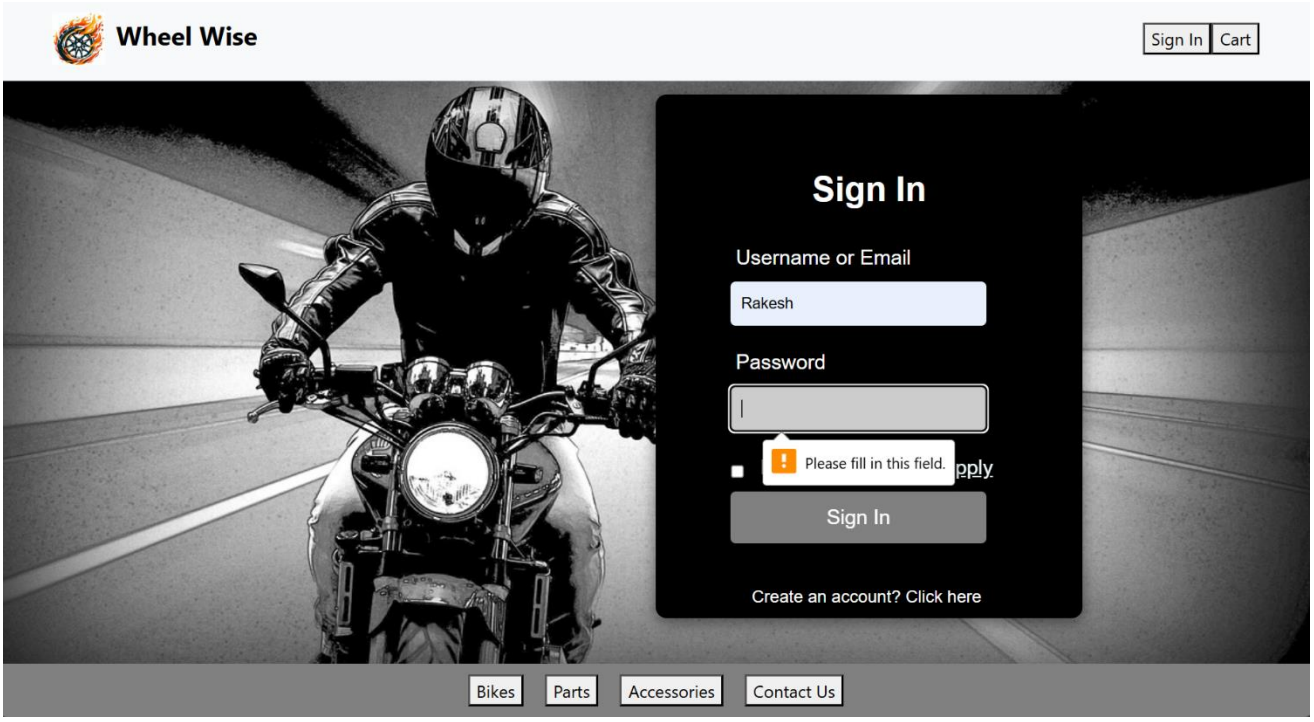

Fig. 5.1. Test Case I

EXPECTED OUTPUT: Sign in verified.

ACTUAL OUTPUT: Sign in failed, indicating to enter the credentials.

2. TEST CASE II

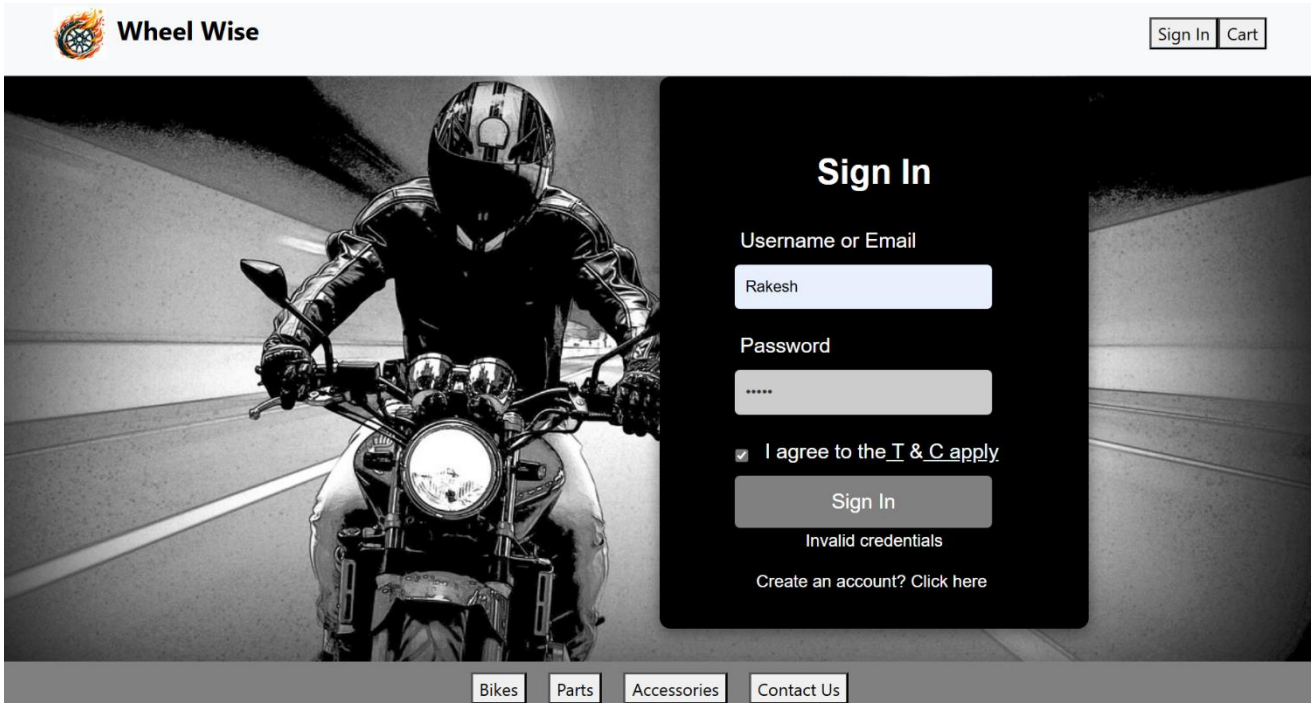

Fig. 5.2. Test Case II

EXPECTED OUTPUT: Sign in verified.

ACTUAL OUTPUT: Sign in failed, indicating to enter valid credentials.

3. TEST CASE III

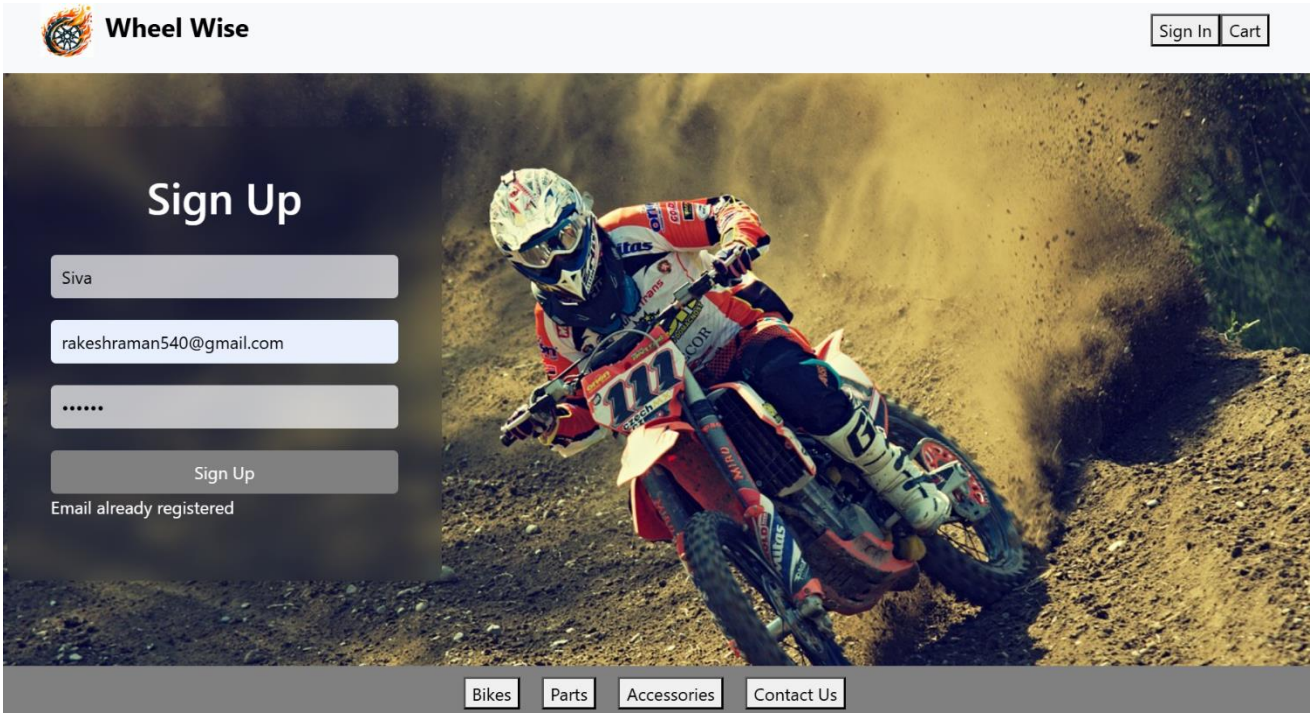

Fig. 5.3. Test Case III

EXPECTED OUTPUT: Sign up verified.

ACTUAL OUTPUT: Sign up failed, indicating email already registered.

4. TEST CASE IV

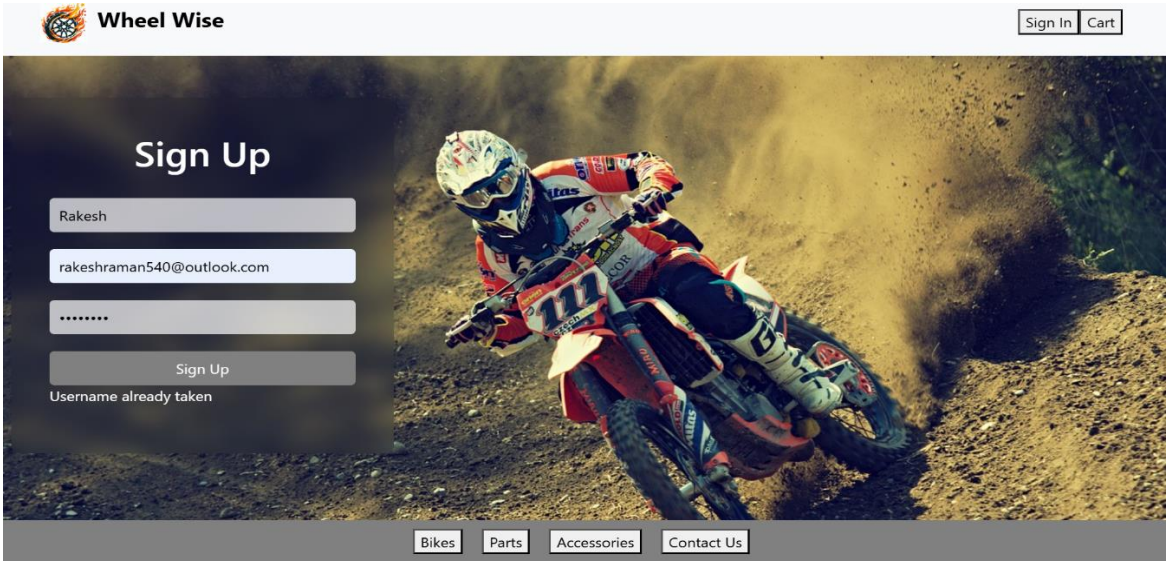

Fig. 5.4. Test Case IV

EXPECTED OUTPUT: Sign up verified.

ACTUAL OUTPUT: Sign up failed, indicating username already registered.

5. TEST CASE V

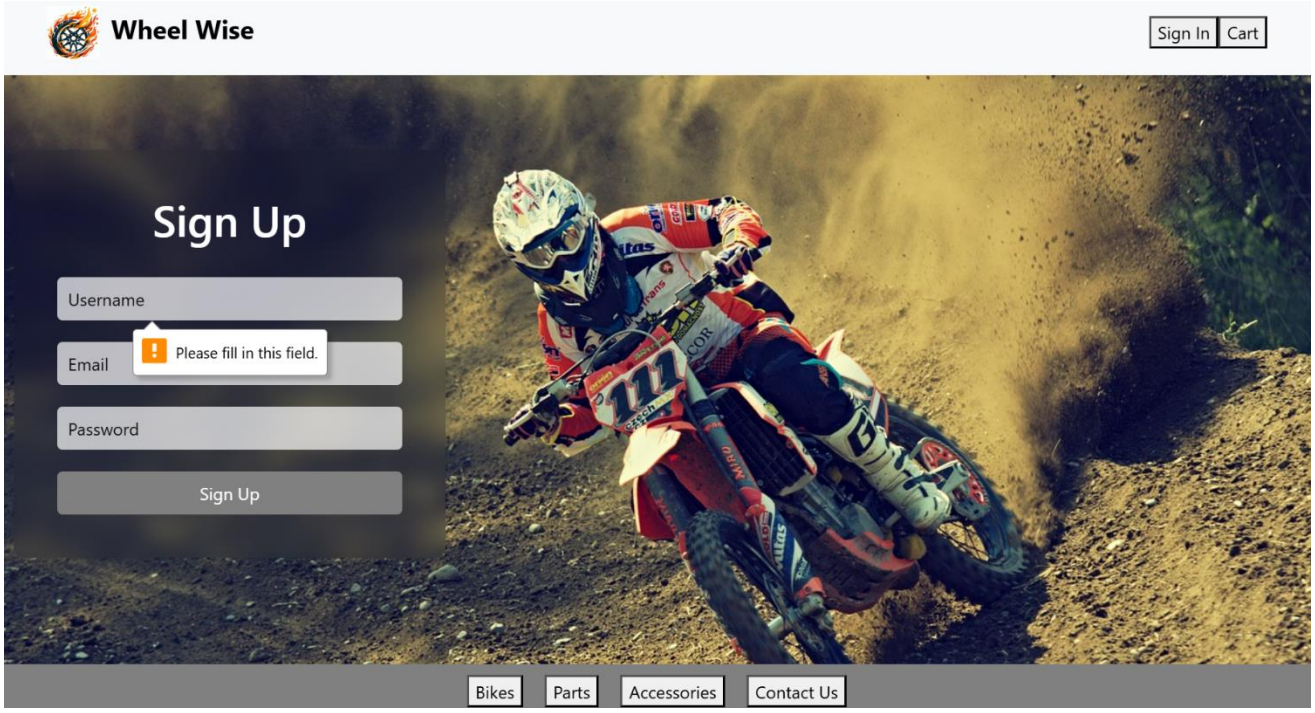

Fig. 5.5. Test Case V

EXPECTED OUTPUT: Sign up verified.

ACTUAL OUTPUT: Sign up failed, indicating to enter the credentials .

CHAPTER 6
CONCLUSION AND FUTURE WORK

6.1 CONCLUSION

The Wheel Wise project represents a significant advancement in the online retail landscape for cyclists, addressing the diverse needs of riders through a user-friendly platform. By focusing on providing a wide selection of bikes and accessories, coupled with personalized shopping experiences and efficient service delivery, the project aims to enhance customer satisfaction and loyalty. The emphasis on seamless interactions, secure transactions, and responsive customer support ensures that Wheel Wise is well-equipped to meet the evolving demands of the cycling community. Overall, this initiative is a vital step toward creating a comprehensive and accessible resource for cyclists, ultimately promoting a healthier and more active lifestyle.

6.2 FUTURE WORK

An alternate solution for enhancing the shopping experience for customers of the Wheel Wise project could be to develop a mobile application that allows users to browse products, manage their shopping cart, and receive personalized recommendations based on their preferences and purchase history. The application could include features such as augmented reality (AR) to visualize bikes and accessories in real-world settings, as well as push notifications for special promotions and new arrivals. This approach would provide a convenient and engaging way for customers to shop without being tied to a desktop, making it more accessible for a broader audience.For improving customer support, an alternate solution could be to implement a chatbot on the Wheel Wise website and mobile app that provides instant assistance for common inquiries, such as product availability, order tracking, and return policies. This chatbot could be equipped with AI capabilities to learn from customer interactions and improve its responses over time. By offering a centralized support tool, customers can receive timely assistance without the need for live chat or email, enhancing overall user satisfaction and streamlining the support process.

CHAPTER 7

APPENDICES

APPENDIX I

SOURCE CODE

Home.js

```
import React, { useContext } from 'react';
import 'bootstrap/dist/css/bootstrap.min.css';
import { Navbar, Nav } from 'react-bootstrap';
import './Home.css'; // Import your custom CSS
import { useNavigate } from 'react-router-dom';
import { UserContext } from '../App'
import Navigate, { Botom } from './Navigate';

function Home() {
   const navi = useNavigate();
```

```
    return (
            <div  className="app-
container">

          <div className="video-
background">
              {/* Video background
can be added here if needed */}
          </div>
                                <div
className="centered-text">
                                    <p
className="gun"></p>
          </div>



      </div>
    );
}

export default Home;

import  React,  {  useContext  }
from 'react';
import
```

```
'bootstrap/dist/css/bootstrap.min.
css';
import { Navbar, Nav } from
'react-bootstrap';
import './Home.css'; // Import
your custom CSS
import { useNavigate } from
'react-router-dom';
import { UserContext } from
'../App'
import Navigate, { Botom } from
'./Navigate';

function Home() {
   const navi = useNavigate();


   return (
          <div  className="app-
container">

         <div className="video-
background">
            {/* Video background
can be added here if needed */}
        </div>
```

```
                                <div
classNameName="centered-text">
                                    <p
classNameName="gun"></p>
            </div>



        </div>
    );
}

export default Home;
```

```
import React, { useContext }
from 'react';
import
'bootstrap/dist/css/bootstrap.min.
css';
import { Navbar, Nav } from
'react-bootstrap';
import './Home.css'; // Import
your custom CSS
import { useNavigate } from
'react-router-dom';
import { UserContext } from
'../App'
```

```
import Navigate, { Botom } from
'./Navigate';

function Home() {
   const navi = useNavigate();



   return (
            <div   className="app-
container">

          <div className="video-
background">
             {/* Video background
can be added here if needed */}
          </div>
                                  <div
className="centered-text">
                                     <p
className="gun"></p>
          </div>



       </div>
   );
}
```

```
export default Home;

import React, { useContext } from 'react';
import 'bootstrap/dist/css/bootstrap.min.css';
import { Navbar, Nav } from 'react-bootstrap';
import './Home.css'; // Import your custom CSS
import { useNavigate } from 'react-router-dom';
import { UserContext } from '../App'
import Navigate, { Botom } from './Navigate';

function Home() {
   const navi = useNavigate();


   return (
            <div  className="app-container">
```

```
            <div className="video-
background">
                {/* Video background
can be added here if needed */}
            </div>
                                    <div
className="centered-text">
                                        <p
className="gun"></p>
            </div>



        </div>
    );
}

export default Home;

import React, { useContext }
from 'react';
import
'bootstrap/dist/css/bootstrap.min.
css';
import { Navbar, Nav } from
'react-bootstrap';
```

```
import './Home.css'; // Import your custom CSS
import { useNavigate } from 'react-router-dom';
import { UserContext } from '../App'
import Navigate, { Botom } from './Navigate';

function Home() {
  const navi = useNavigate();


  return (
        <div className="app-container">

       <div className="video-background">
          {/* Video background can be added here if needed */}
       </div>
                              <div className="centered-text">
                                <p className="gun"></p>
```

```
                    </div>


                </div>
            );
        }

        export default Home;
```

Home.css :

```
.Useraccount{
  margin-bottom: 0;
  align-content: center;
  padding-right: 20px;
}
.app-container {

    height: 100vh;
    font-family: "Copperplate", "Copperplate Gothic
Light", fantasy;
    background-image: url('C:\Project(App
```

```
Development)\Front-
end\Home\home\public\assets\home.jpg');
}

.top-navbar {
    position: fixed;
    width: 100%;
    display: flex;
    justify-content: space-between;
    align-items: center;
    padding: 10px 50px; /* Adjust padding as needed
*/
    background-color:#fefdfc; /* Semi-transparent
background */
    z-index: 1000;
}

.navbar-brand {
    font-size: 24px;
    font-weight: bold;
}

.search-input {
    padding: 5px;
    margin-right: 10px;
```

```
    border: 1px solid #ccc;
    border-radius: 4px;
}

.search-button {
    padding: 5px 10px;
    background-color: #28a745;
    color: white;
    border: none;
    border-radius: 4px;
    cursor: pointer;
}

.dealer {
    display: flex;
    gap: 20px; /* Space between links */
}

.dealer a {
    text-decoration: none;
    color: #000; /* Change link color as needed */
}

.video-background {
    position: absolute;
```

```
    top: 0;
    left: 0;
    width: 100%;
    height: 100%;
    overflow: hidden;
    z-index: -1;
}

.centered-text {
    position: absolute;
    top: 50%;
    left: 50%;
    transform: translate(-50%, -50%);
    color: rgb(237, 237, 237);
    font-weight: bold;
    font-size: 3em; /* Adjust size as needed */
    text-align: center;
}

.bottom-navbar {
    position:fixed;
    bottom:0;
    left: 0;
    z-index: 3;
    bottom: 0;
```

```
    width: 100%;
    background-color: #808080;
    z-index: 1000;
    padding: 10px;

}

.footer-nav {
    display: flex;
    justify-content: center;
    gap: 20px; /* Space between footer links */
}

.footer-nav a {
    text-decoration: none;
    color: #808080; /* Change link color as needed */
}

.footer-nav a:hover {
    text-decoration: underline; /* Underline on hover
*/

}
.dealer{
  padding-left:300px;
```

```
}
/* src/App.css */
/* Existing styles... */

.bottom-navbar {
    position: fixed;
    bottom: 0;
    width: 100%;
    background-color: #808080;
    z-index: 1000;
    padding: 10px;
}

.footer-nav {
    display: flex;
    justify-content: center;
    gap: 20px; /* Space between footer links */
}

.footer-nav a {
    text-decoration: none;
    color: #ffffff; /* Change this to your desired color
*/
    transition: color 0.3s; /* Smooth transition for
hover effect */
```

```
}

.footer-nav a:hover {
    color: #7f786e; /* Change this to your desired
hover color */
    text-decoration: underline; /* Underline on hover
*/
}
```

APPENDIX II (SCREENSHOTS)

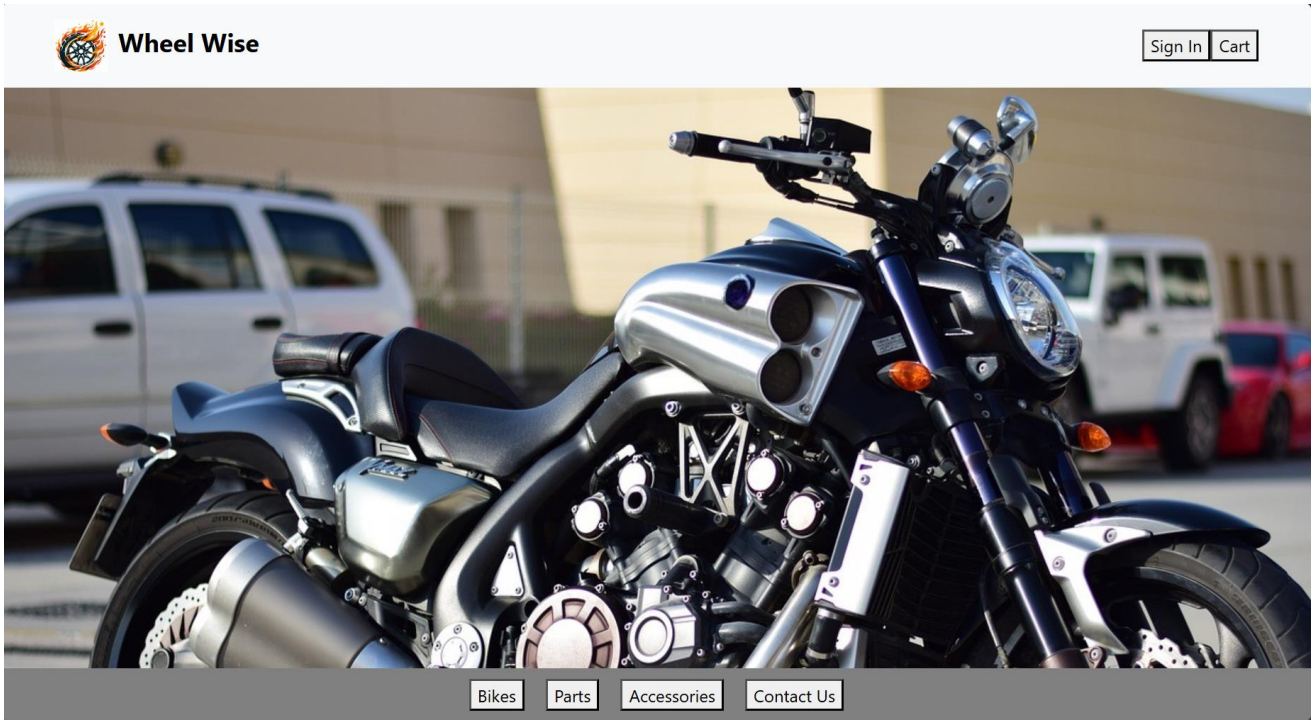

Fig. A.2.1. Home Page

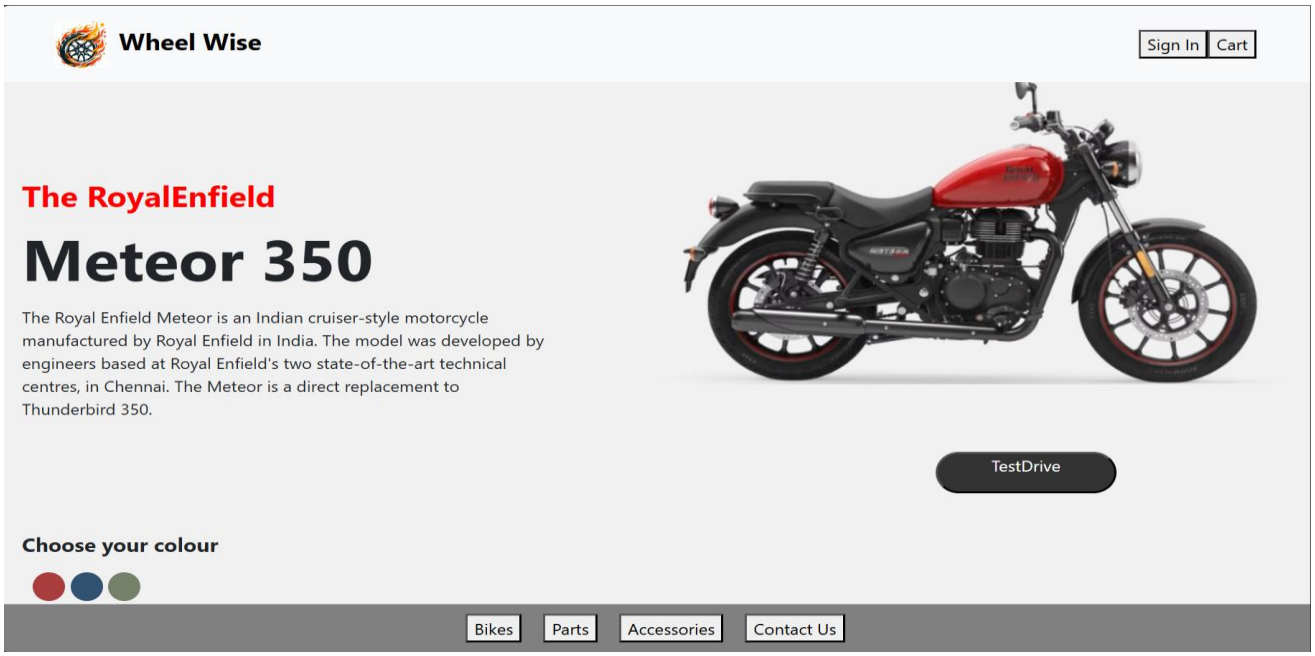

Fig. A.2.2. Bike Menu

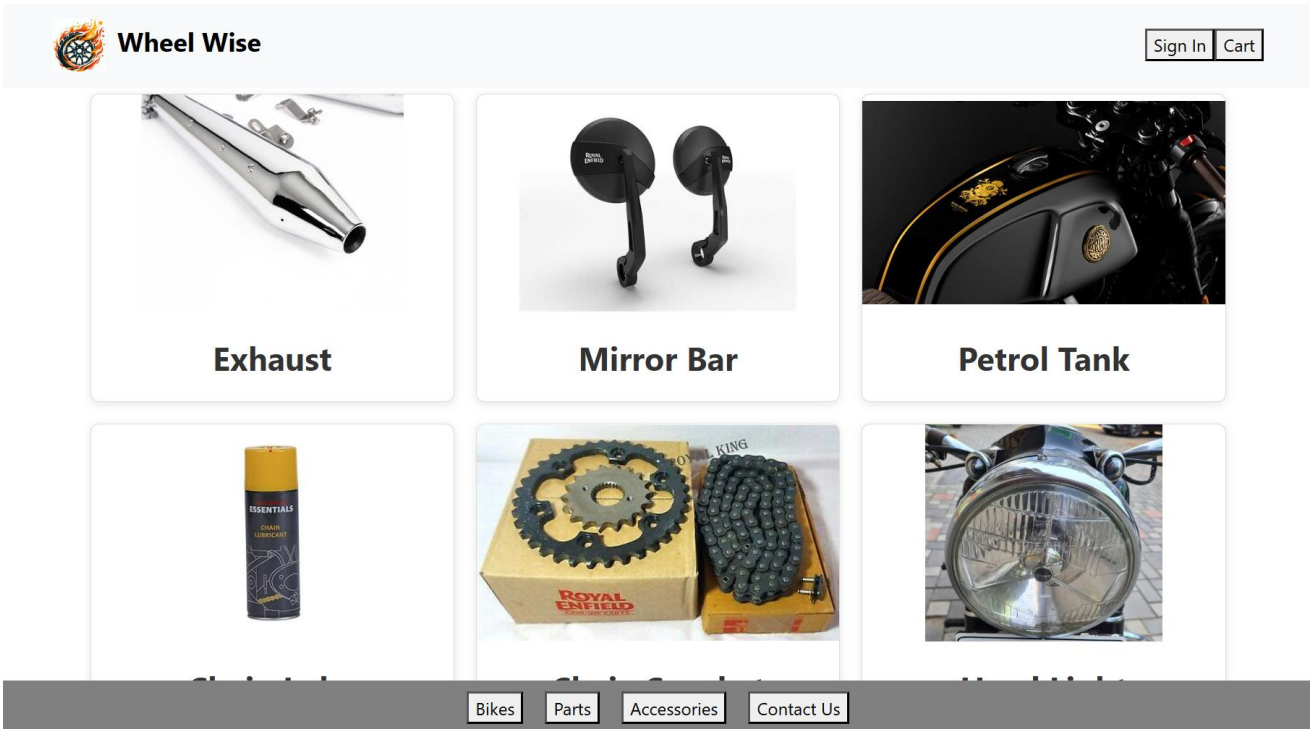

Fig. A.2.3. Spare(Bike) Page

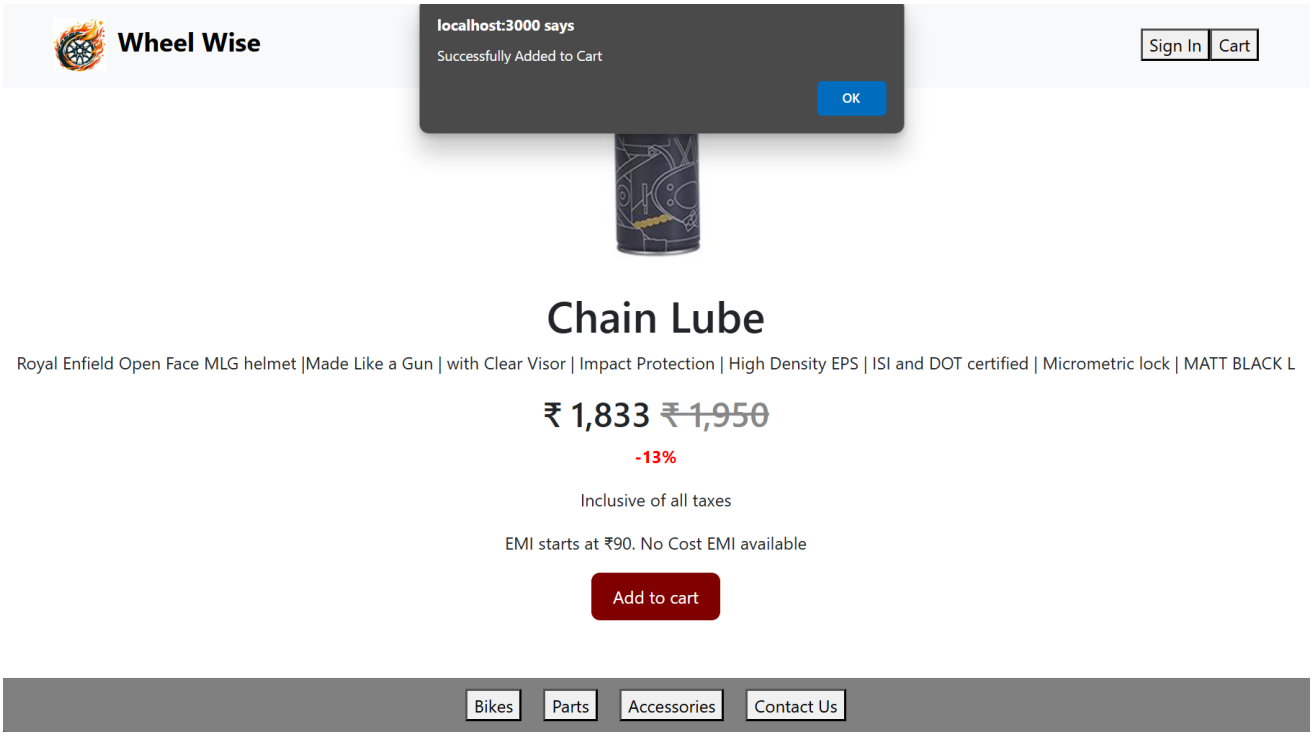

Fig. A.2.4. More Images of Spare

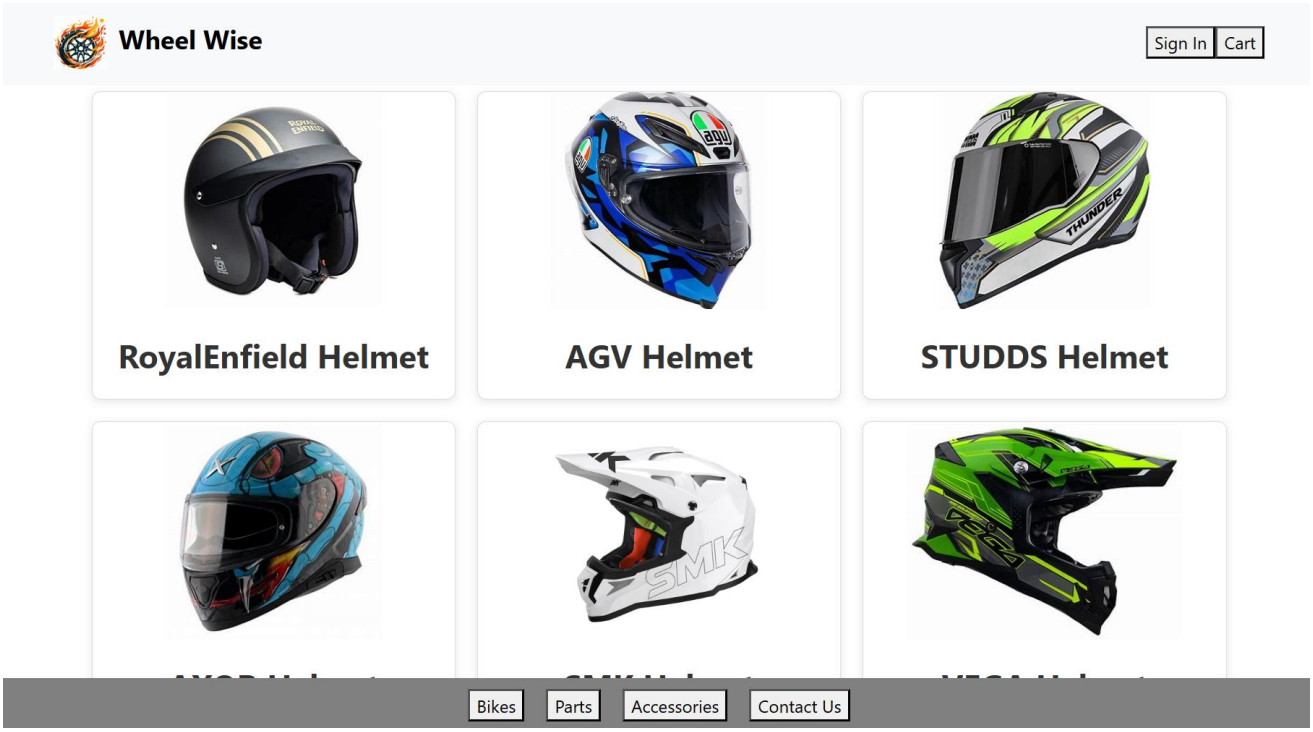

Fig. A.2.5. Accesories Page

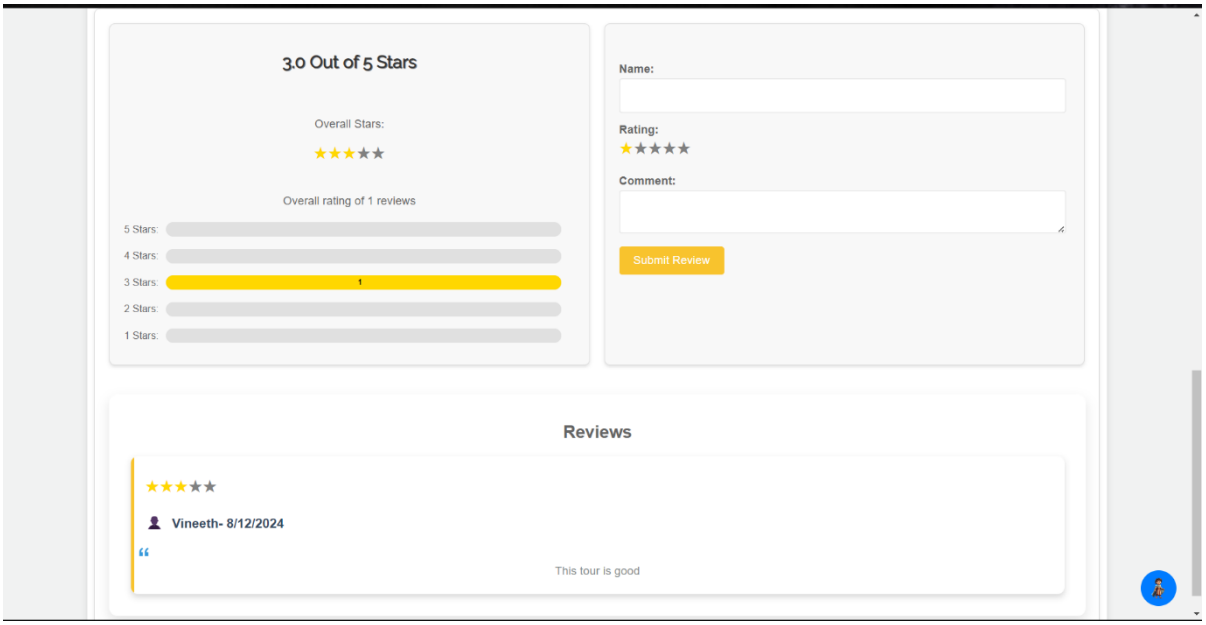

Fig. A.2.6. Review Management (Yet to be added)

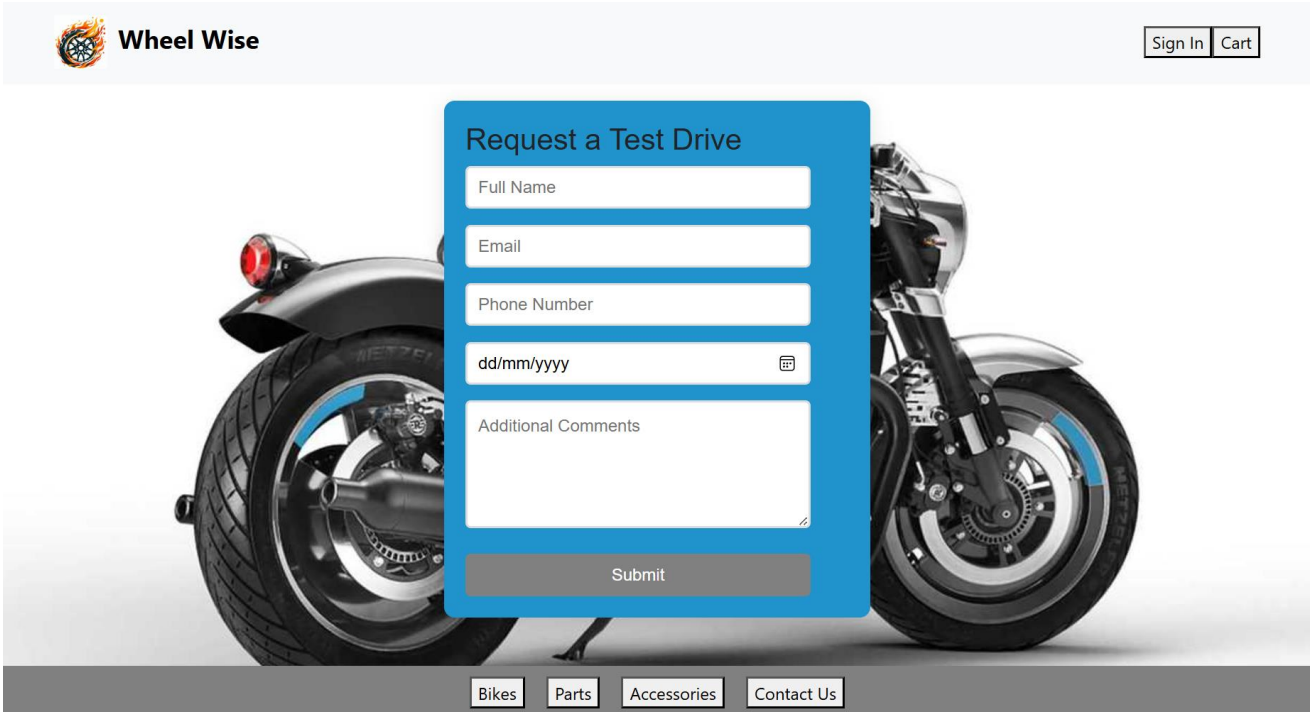

Fig. A.2.7. Test Drive Page

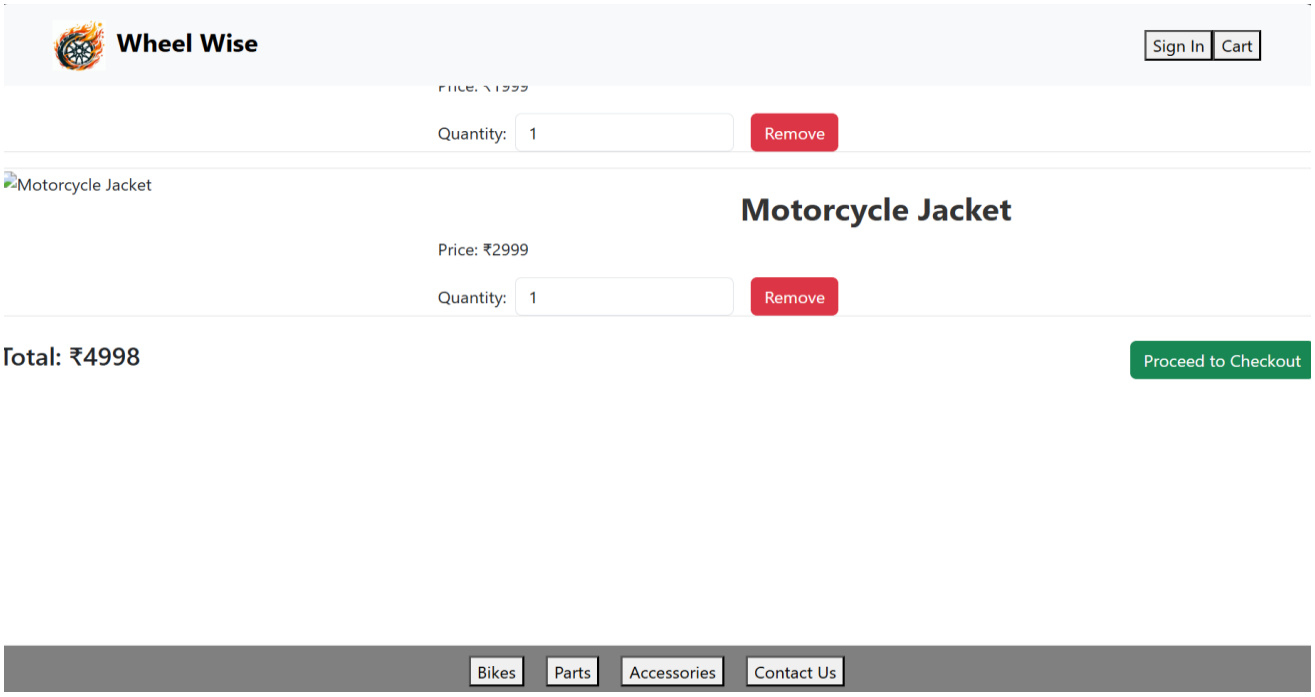

Fig. A.2.8. Cart Page

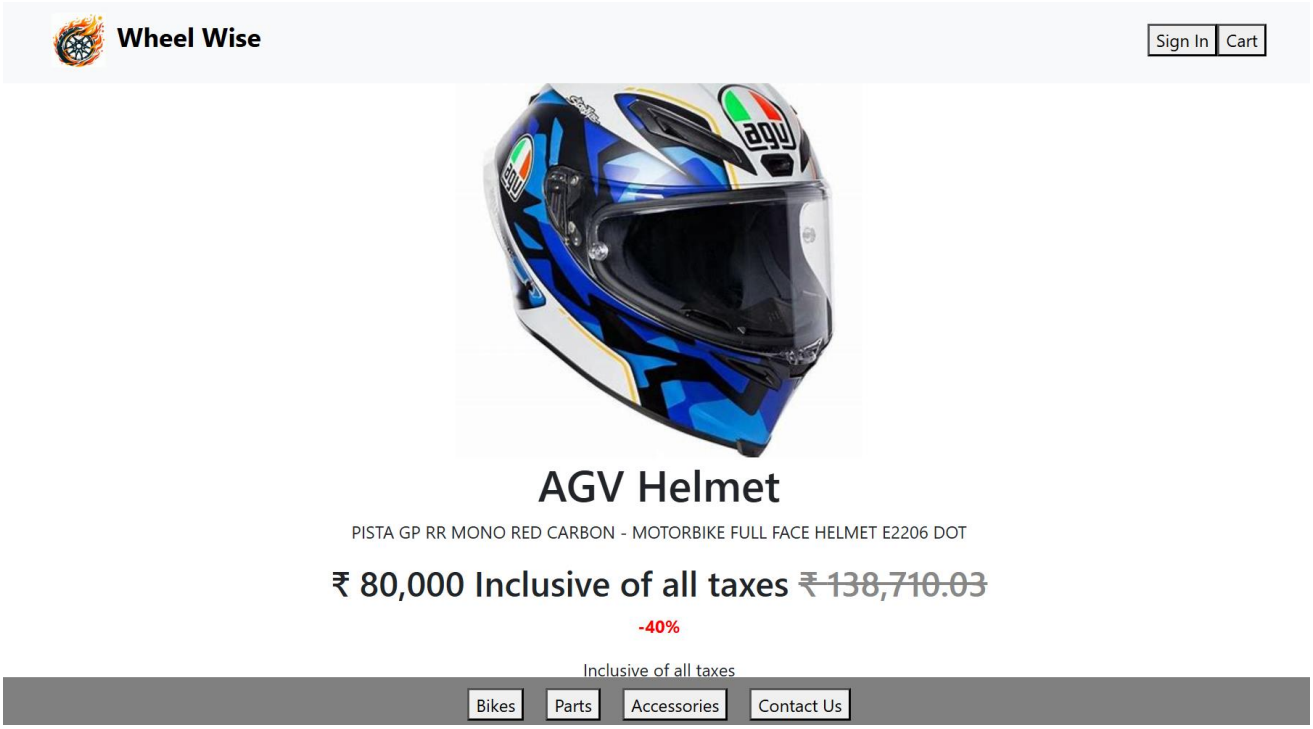

Fig. A.2.9. Inside Accessories Page

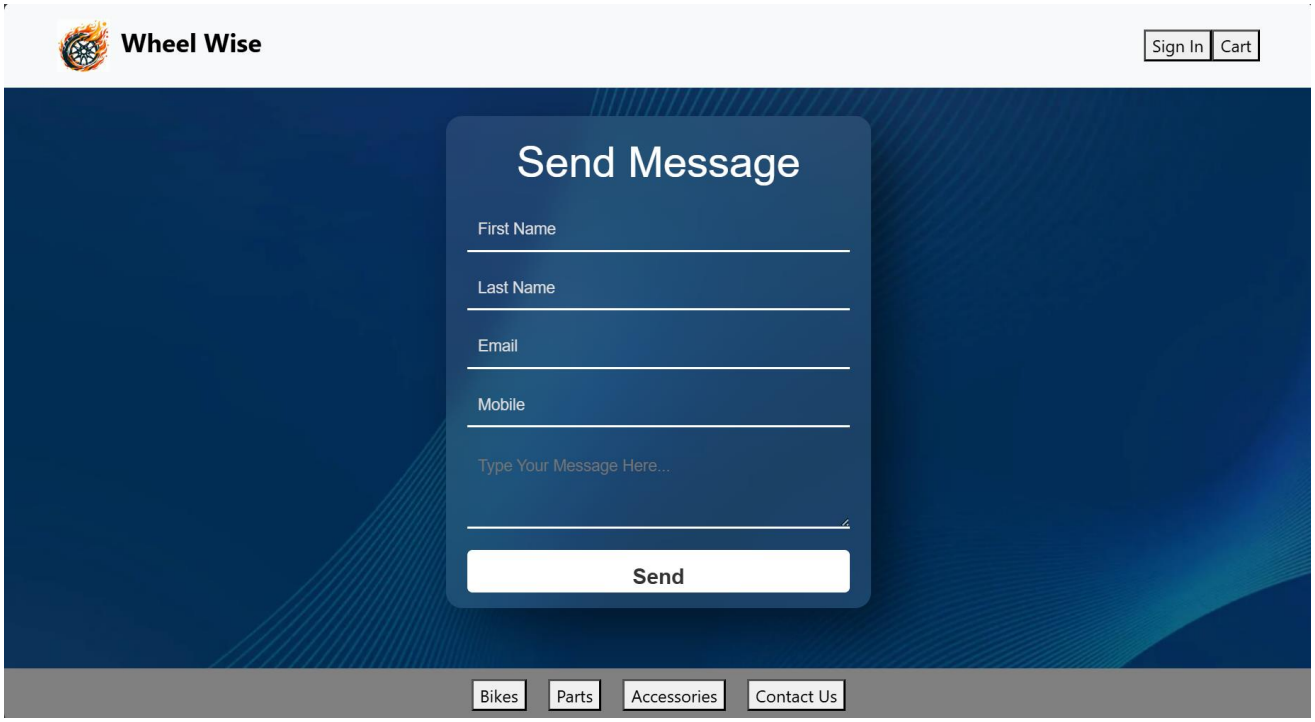

Fig. A.2.10. Contact Us

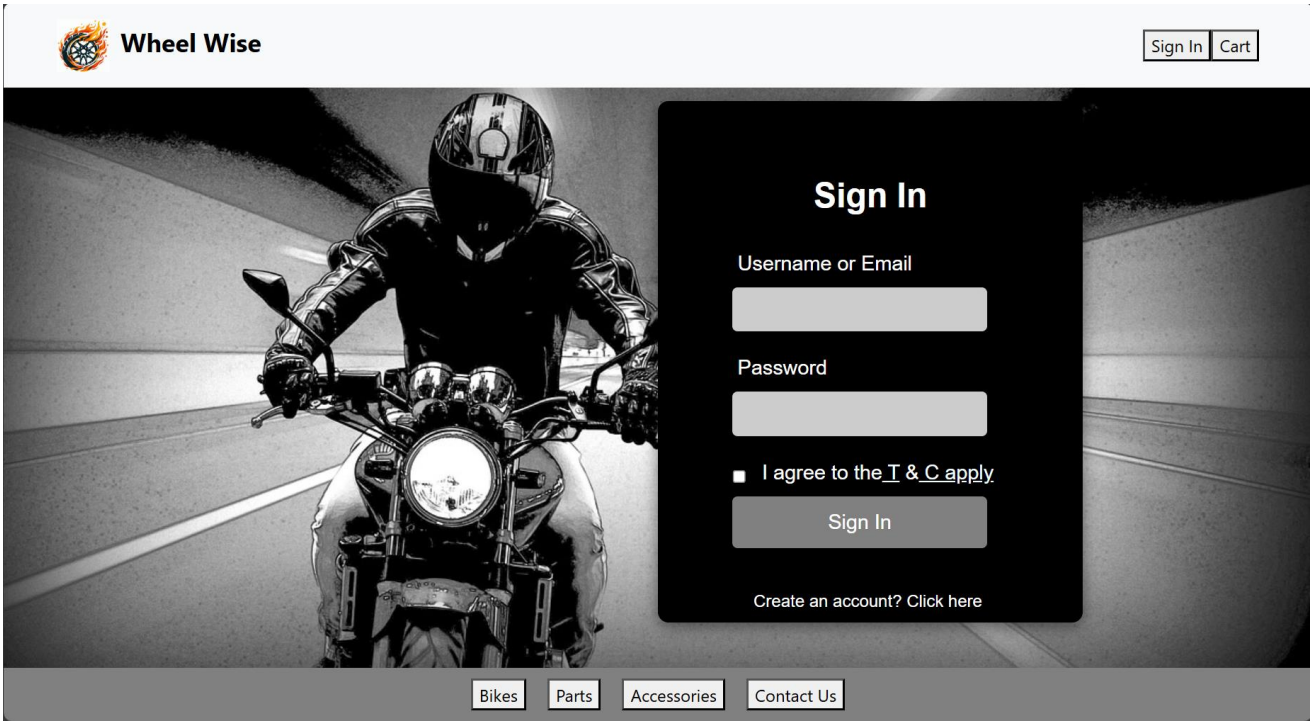

Fig. A.2.11. Sign in Management

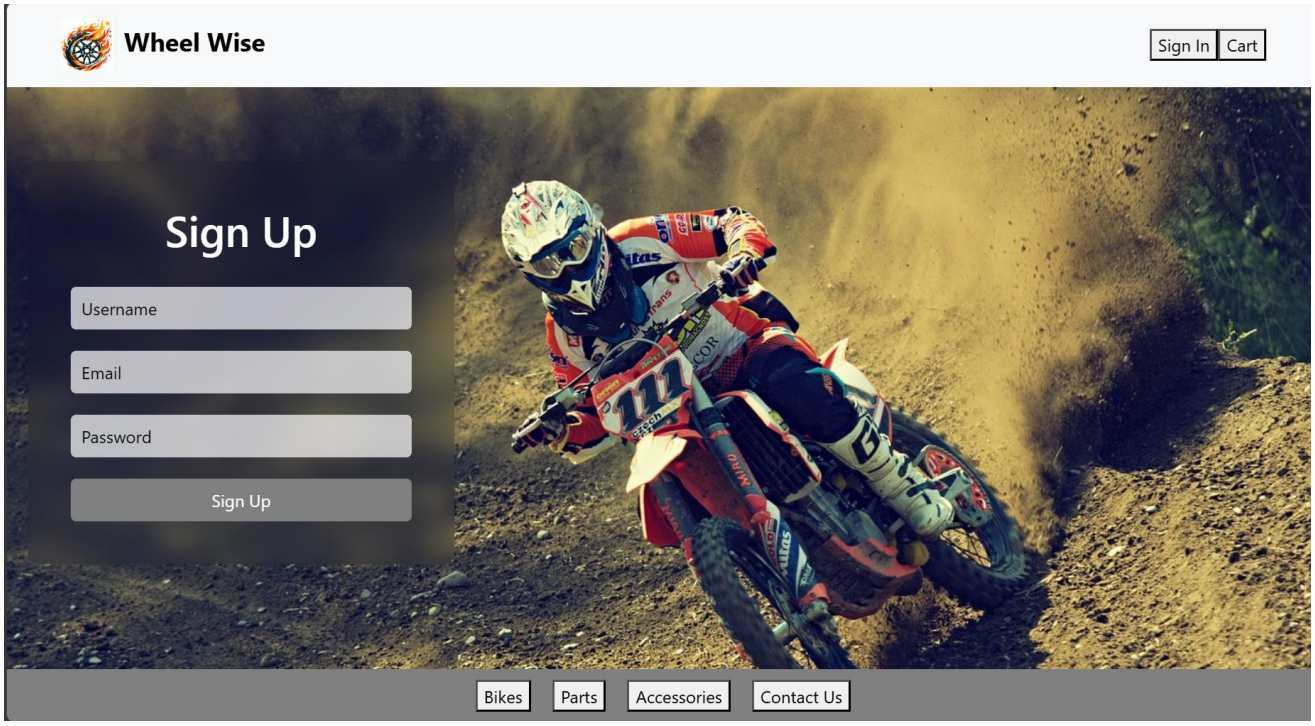

Fig. A.2.12. Signup Management

Fig. A.2.13. User Profile Management

REFERENCES

Web references:

1. PostgreSQL Official Documentation: https://www.postgresql.org/docs/
2. React Official Documentation: https://reactjs.org/docs/getting-started.html
3. Swagger Official Documentation: https://swagger.io/tools/swagger-ui/
4. Java Extensions for Visual Studio Code Official Documentation: https://code.visualstudio.com/docs/java/extensions

Book references:

1. Amanda Davis (2022), "The Ultimate Guide to Home Care for Seniors: Everything You Need to Know", Senior Care Publications
2. Emily Wilson (2022), "The Complete Guide to Home Care for Seniors", Elderly Care Books
3. Jennifer Brown (2021), "Aging in Place: A Comprehensive Guide to Home Care Services", Senior Care Publishers
4. Jessica Adams (2022), "Home Care Solutions for Seniors: A Complete Handbook", Caregiver Press
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