JCBI
Journal of Computing & Biomedical Informatics Volume 09 Issue 01
ISSN: 2710 - 1606 2025

Research Article
https://doi.org/10.56979/901/2025

An Eco-Friendly Affordable Web-Based Fashion Sharing Platform Promoting Sustainability

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Received: April 06, 2025 **Accepted:** May 21, 2025

Abstract: Today's item often gives the fashion industry an entry barrier, as it is very expensive and exclusive. This is why many are not able to indulge in fashionable, trendy items. FashionFix, a cost-effective, web-based platform introduced by this bachelor's research, bridges the gap between people who desire fashionable clothing and those who have unused fashion items. It provides the ability to securely rent, lend, and buy clothes, shoes, and accessories with a user-friendly interface using the sharing economy to provide premium fashion at affordable prices. The intuitive browsing and item selection process guarantees seamless login and signup processes. Secure payment is made via Stripe, tracking orders in real-time, and renting out unused fashion items with administrators in charge of the approval workflows. Built on React for the frontend, Java Spring Boot for the backend, and MySQL for the database, it is extremely reliable and efficient. It also promotes sustainability since it minimizes fashion waste, and it can gain users for underutilized items. A survey showed that 93% of the individuals surveyed could not afford fashionable attire due to financial reasons. Meanwhile, 65% would use a platform providing affordable rental options. The work addresses financial barriers and promotes awareness on environmental issues, ensuring that it makes a long-term impact on sustainable fashion.

Keywords: Sustainable Fashion; Java Spring Boot; Machine Learning; User Friendly App

1. Introduction

The glamour of fashion has always been something costly and exclusive, thus expensive. This makes it unattainable for most to indulge in fantasies of dressing well for special occasions. Finally, people have the culture of piling up so much apparel, shoes, and accessories that lay idle in their closets, gathering dust [1]. In a world where one wants fashionable apparel but gives it very little space, there is bound to be room for other more creative ideas. Our research on Affordable Web-Based Fashion Sharing Platform aims to is to bridge through the development of an online platform that will enable sharing or lending, renting, and then purchasing fashion items. It connects people holding unused fashion goods with those seeking fashionable wear at a very affordable price. With borrowings of style, along with principles of the sharing economy.

Many people, though the financial conditions do not permit them to acquire fashionable wearables, have other quality items of such wearables that are hardly put to use. Our platform will build a win-win situation through which people owning currently unused items can rent or sell them and earn an income while others may get stylized fashion at affordable prices. This research discusses the development of this platform: what problem it addresses, the literature guiding the design, the methodology involved in its development, and the results of our endeavor. This comes with a discussion on the general implications of this platform for sustainability by reducing fashion waste and promoting a circular economy in fashion [2].

2. Literature Review

With increased environmental concerns, advancement of technology, and changes in consumer behavior, fashion sharing and renting has emerged as a new, sustainable alternative to existing consumption patterns. This research reviews the most relevant pieces of research to emphasize crucial factors in influencing consumer behavior and attitude towards fashion renting to inform motivations, barriers, and market dynamics that shape this increasing industry [3].

Consumer attitudes towards fashion rental services are strongly driven by sustainability perceptions and general attractiveness of rental models. Christmann and Pasztuhov (2024) indicate that perceived sustainability and perceived fun of the business model both have a positive effect on consumers' attitudes toward clothing rental subscription services [7]. This means that consumers increasingly comprehend the environmental benefits of leasing over owning, and such is critical in the war on the fast fashion crisis.
Moreover, Waris et al. concluded in 2024 that since the growth of online fashion rentals is raising awareness among people towards giving second-life clothing, it supports how the sustainability concept is not just an influencer in a purchase decision but enhances customer loyalty towards the service [8]. This resonates with the Theory of Planned Behavior where attitudes have a very significant effect on intentions. Therefore, a service that communicates its efforts toward sustainability will build a positive attitude and motivate customers [4].

Several key factors are driving the intentions to rent fashion items. Tu and Hu (2018) highlight that compatibility matters most in driving consumers to have a positive assessment and perception of online clothes renting [5]. This means that the rental platforms must be compatible with consumer lifestyles, preferences, and values for improved user engagement.

Besides, Dissanayake and Pal (2021) argue that stakeholder collaborations along the used clothing supply chain need to be built up for the implementation of disruptive business models [6]. With consumer, retailer, and environmentalists' perspectives, stakeholder integrations can lead to innovative rental options that are more appealing; thus, the intent of consumers to rent over purchasing increases.
Despite a positive attitude, there are several barriers hindering the popularization of fashion renting. Heeju Noe (2021) emphasizes the need to know the non-users of fashion renting services, indicating that knowledge of the non-users frequently provides important and unique implications [7]. Knowing why people don't use such services that is, what drives the nonadopting process can provide insights on what the rental service should modify to attract its potential users. According to Chao (2022), streamlined rentals will be a necessity to enhance user experience and avoid frustration that will make consumers not want to engage in the rental services [8]. Common concerns and transactions should be made smoothly through easy use of platforms, clear terms, and responsive customer services. The COVID-19 pandemic has changed consumer behaviors and perceptions toward fashion sharing platforms to a great extent. Lee et al. (2021) studied the change in fashion sharing services before and after COVID-19 and concluded that hygiene became the top concern for consumers while making decisions [9]. The pandemic raised the consciousness of consumers toward health and safety, and this made them look more into the hygiene practice of rental services. Platforms that effectively communicate their cleaning protocols and product safety assurances stand to regain consumer trust as the market recovers.

Furthermore, the pandemic made digital solutions more appealing for people, and online rentals seem to be more attractive. Waris et al. (2024) suggested that the success of fashion renting depends on consumer awareness; that is, effective communication and marketing strategies are significant in a post-pandemic context. Styvén and Mariani (2021) discussed the antecedents for buying used apparel on sharing economy sites: perceived sustainability, economic incentives, and desire to distance themselves from the old consumption model [10]. These factors are part and parcel of the more macro objectives that fashion-sharing service providers set for providing relatively cheap, environmentally responsible alternative systems of fast fashion consumption [11].

Amaral and Djuang (2023) concentrated on the effect of social influence, shopping lifestyle, and impulsive buying on the purchase intentions of preloved products. According to their study, social influence and impulsive buying behaviors are major drivers for the purchase of preloved clothing. This insight suggests that social features and personalized recommendations should be integrated into fashion-sharing platforms to capitalize on these behavioral drivers [12-14]. Current literature is very useful in providing insights into consumer behavior and attitudes toward fashion renting. However, future research

should be longitudinal in nature to capture changes in consumer perceptions over time, especially in reaction to environmental events and market shifts. In addition, empirical studies are needed to assess the effectiveness of various marketing strategies in influencing consumer adoption and to provide actionable insights for practitioners in the fashion rental industry [15-16].

2.1. Problem Statement

Though one can style themselves with great taste for special occasions, such a thing remains unattainable because fashion has always been a luxury few could afford. Financial constraints further exacerbate the problem of exclusivity: fewer people can afford fashionable wear, shoes, and accessories. Directly opposite to this are many people who have quality fashionable pieces never used but hanging in the closet gathering dust. The idea of this research is to close the gap between demand and financial constraints that bar them from receiving fashionable goods by developing a web-based sharing platform for fashion goods.

3. Aim and Objectives

The online clothes and shoe website will be formatted to enable users to both rent and lend clothes, footwear, and accessories both safety and efficiently. In light of this, an online clothing website is devised towards achieving the following:

1. To develop a fully functional and user-friendly online platform integrating lending and renting seamlessly.
2. To enable users to easily list, manage their products on the platform, ensuring a smooth and efficient process for both lenders and renters.
3. To implement features like a robust review and rating system, clear communication channels, and transparent pricing for enhanced user engagement and community trust.

3.1. Novelty and Research Scope

Scope of the Research The scope of the Affordable Web-Based Fashion Sharing Platform defines the bounds and scope of the system. It is a web-based fashion sharing platform aimed at providing an all-inclusive solution for the consumers to acquire trendy clothing items at an affordable price and for the people looking forward to monetizing underutilized clothing. It is focused on two categories of users: those who would like to rent or buy fashionable items and those who want to share or rent out pieces of their wardrobe.

Features include user authentication and marketplace to list, browse fashion items; it has an integrated checkout and payment using Stripe and includes an admin panel to handle the orders and listings. The user can find out whether the items are available; they can view detailed descriptions of the clothes and even rent or purchase through a simple procedure. For those renting out pieces, the system provides submitting item details, which are approved and then listed by the administrator.

3.2. Sustainable Development Goals (SDGS)

This falls under two key Sustainable Development Goals (SDGs, and hence falls under the commitment to creating economic growth and sustainability within the fashion industry including decent work and economic growth (SDG 8), responsible consumption and production (SDG 12).

4. Research Methodology

The purpose of this research is to outline the design and methodology used to develop the Affordable Web-Based Fashion Sharing Platform by discussing the system architecture, tools and technologies, database design, frontend and backend design, key algorithms, and data collection mechanisms. The goal of this platform is to provide users with an accessible, easy-to-use interface for sharing, renting, or purchasing fashion items, thereby fostering sustainability and affordability.

The above Figure 1 is an illustration of the technologies used in the platform, that is, react for frontend work, Spring Boot for backend work, and MySQL to manage the database with a view to giving a smooth UX.

i. **Presentation Layer:** The frontend with React is implemented and interacts with the backend services.
ii. **Application Layer:** This layer includes a Java Spring Boot that defines the business logic in an application that manages user authentication, products management, and transaction processing.

iii. **Database Layer:** User data, fashion items, transaction details, and rental history are maintained through a MySQL database. This layered approach is scalable and maintainable.

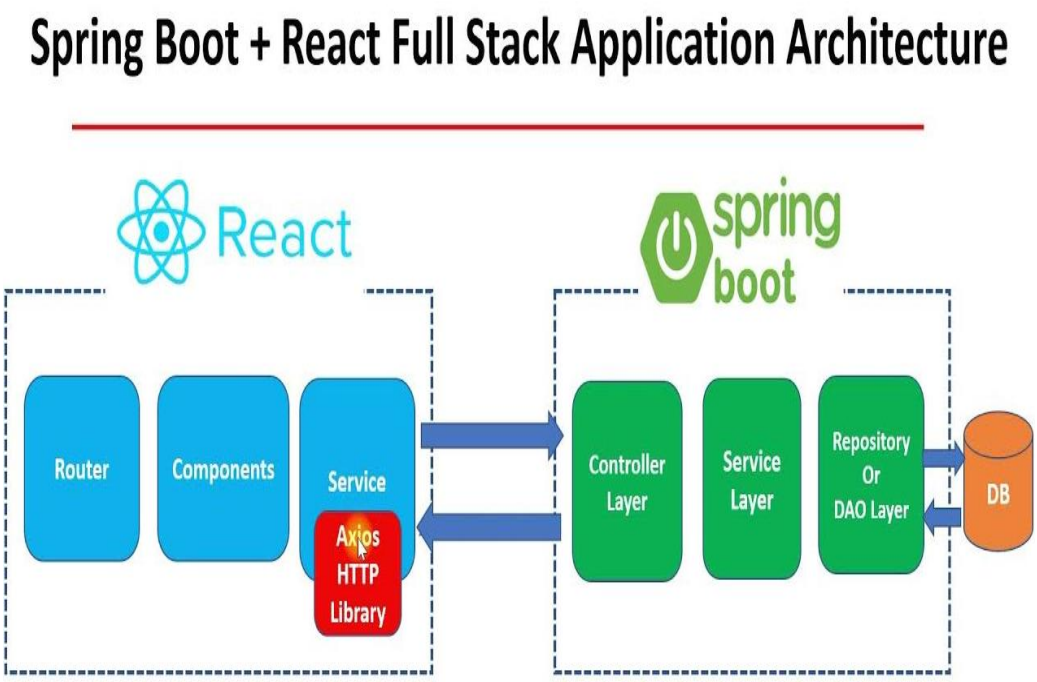

Figure 1. Technology Stack Overview of the FashionFix Platform

4.1. Frontend (Client-Side)

HTML5 & CSS3, JavaScript (ES6+), Axios, An ES6+ JavaScript library, helping developers make HTTP calls from frontend to backend. A much lighter approach to handing API call handling, and error or response management for axios calls.

4.2. Backend (Server-Side)

Java Spring Boot, Spring Security, JSON Web Token (JWT) is used for secure authentication of the user. Once logged in successfully, the backend end returns a JWT token that is then used by the front end in subsequent API calls to ensure safe sessions.

4.3. Hibernate ORM Database

MySQL, Hibernate ORM, Hibernate is an Object-Relational Mapping tool based on Java that simplifies database interactions by allowing developers to work with Java objects rather than writing raw SQL queries. Hibernate ensures smooth mapping between the application's objects and the database tables.

4.4. Postman Testing

Postman: API endpoints test tool. It gives an opportunity for the team to check how RESTful APIs were developed using Spring Boot with HTTP request simulation.

4.5. Tools and Technologies

The Affordable Web-Based Fashion Sharing Platform uses a few tools and technologies to ensure efficiency, scalability, and maintainability while developing it. Below are the main tools and technologies used and their categories, including frontend, backend, database, and supporting development tools.

4.6. Research Flow Diagram

The Sequence Diagram describes the interactions and flow of operations within the FashionFix platform. It depicts in a step-by-step manner how different components like Customer, Admin, System, and Payment Gateway interact for all core processes such as:

User Authentication (Login/Signup), Order Placement (Browsing, Adding to Cart, and Payment), Submission and Approval for an Item rental.The diagram demonstrates the step-by-step communication between these entities, highlighting the sequence of requests, responses, and transitions between system components.

Figure 2 represents the sequence between the users and the system components and database in the main processes involved in browsing items, making orders, and renting fashion items.

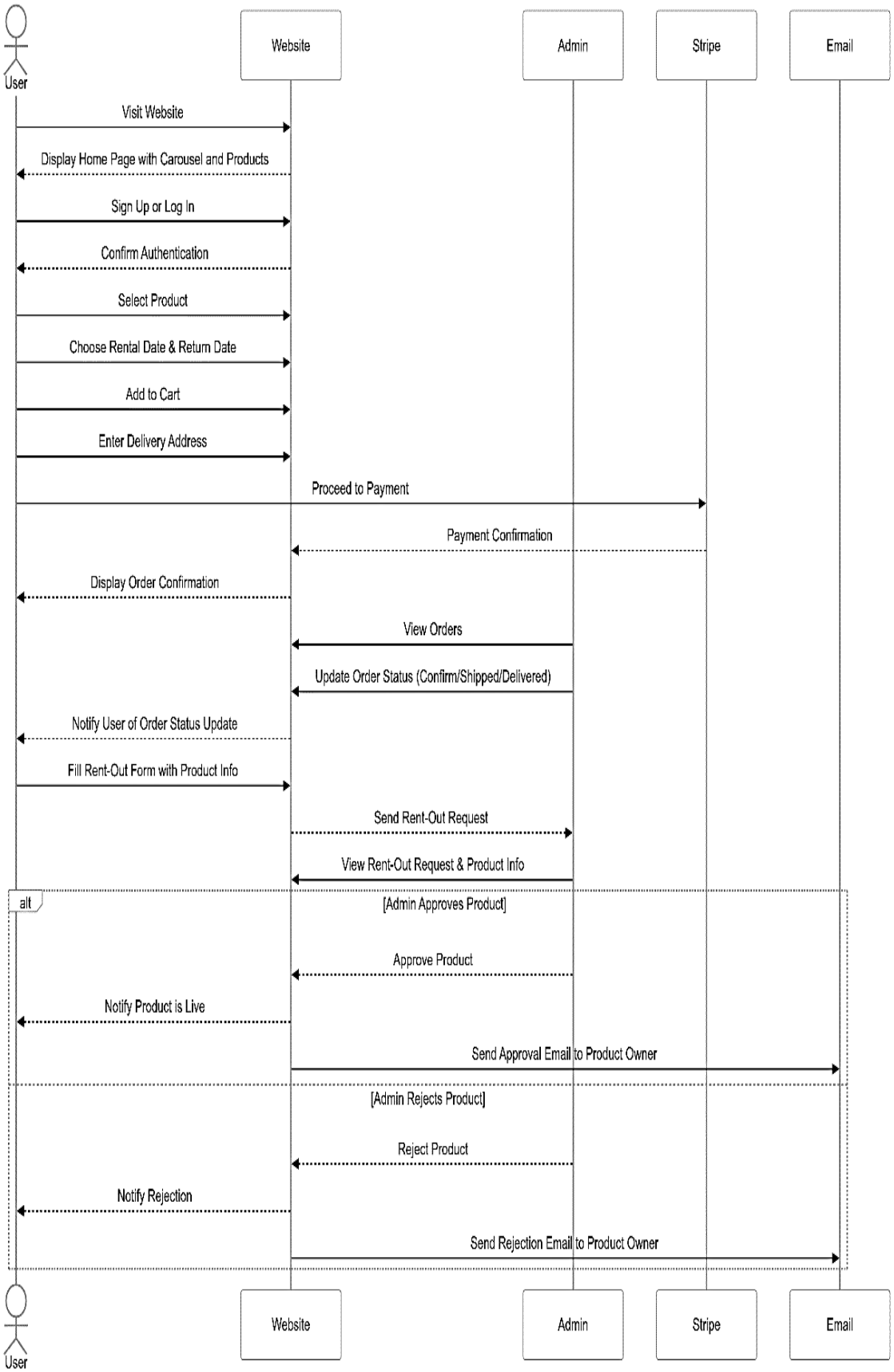

Figure 2. Sequence Diagram for System Workflow

4.7. Workflow Process of Fashionfix app with Database

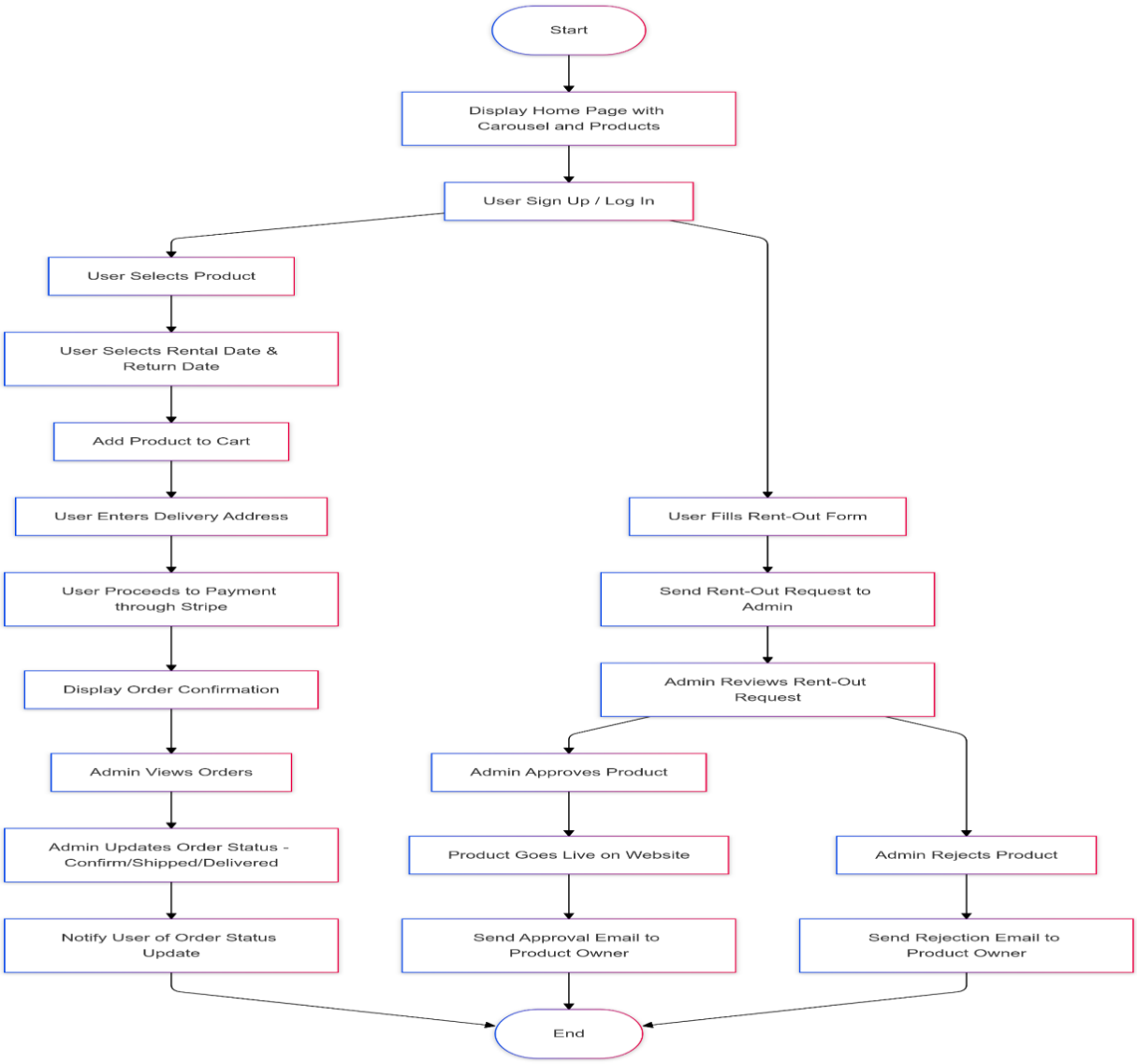

Figure 3. Flow Chart Representing System Process

In Figure 3 the flowchart described how the system follows through a step-by-step working of the system with reference to login and selection by a user to a point as regards order fulfilment at the back-end followed by integration with payment options. The Flow Chart illustrates the logical flow process within the platform. The Flow Chart will simplify the process flow of a system workflow as it is broken down into the most essential functionalities, namely: Customer Journey: Beginning from visiting the homepage to completion of a transaction or view of order status. Admin Processes: Approving or rejecting items for rent, managing orders, and administering activities in the platform.

4.8. Business Logic Workflow

The business logic inside the Spring Boot service layer would orchestrate the major functionality which will keep the entire system working on the platform called FashionFix. All these major and minor functionalities listed as under.

- **User Authentication**: The service layer also offers secure authentication based on **JWT (JSON Web Tokens)**. Therefore, users can be authenticated with their respective role-based access enabled for login sessions. Customers and admins could thus access functionalities based upon the roles.
- **Rent-out Management**: The service layer lets users submit, approve, and update the status of rent-out items. It facilitates smooth communication between the user and the administrator in terms of:
  - Ensure product subbed by user
  - Accept/Decline the request to lend any of the products to the users and the status update accordingly.

- **Order Processing**: Robust order handling system has been inducted for managing the order of;
  - Integration of creating and pay order via Stripe Api.
  - Validation of shipping details provided by the user.
  - Users are able to retrieve and view their historical and active orders via their dashboards.
- **Product Management**: The application shall present dynamic search and filtering capabilities with respect to the products. Therefore, a user will navigate through products with regards to one or more of the attributes such as
  - Category Type like dresses, accessories types
  - Colors
  - Rentals prices and purchase price.
  - Availability status.

All these business logic elements harmonize to provide a secure, reliable, and user-friendly platform that makes the processes for customers as well as administrators less complicated.

5. Results and Discussion

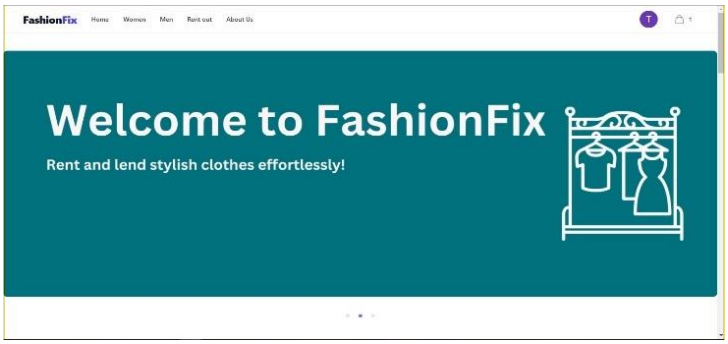

Figure 4. Home Page with Navbar and Carousel

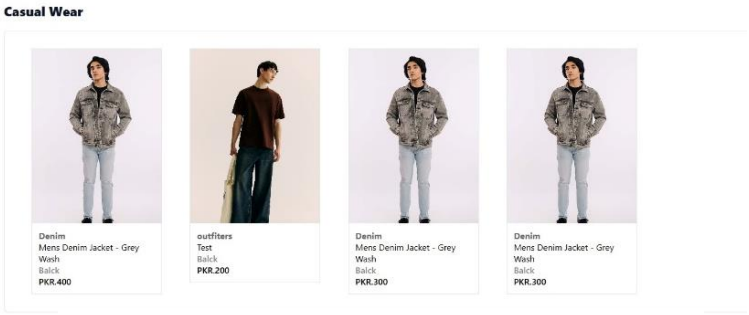

Figure 5. Browse Items –Display of Available Products

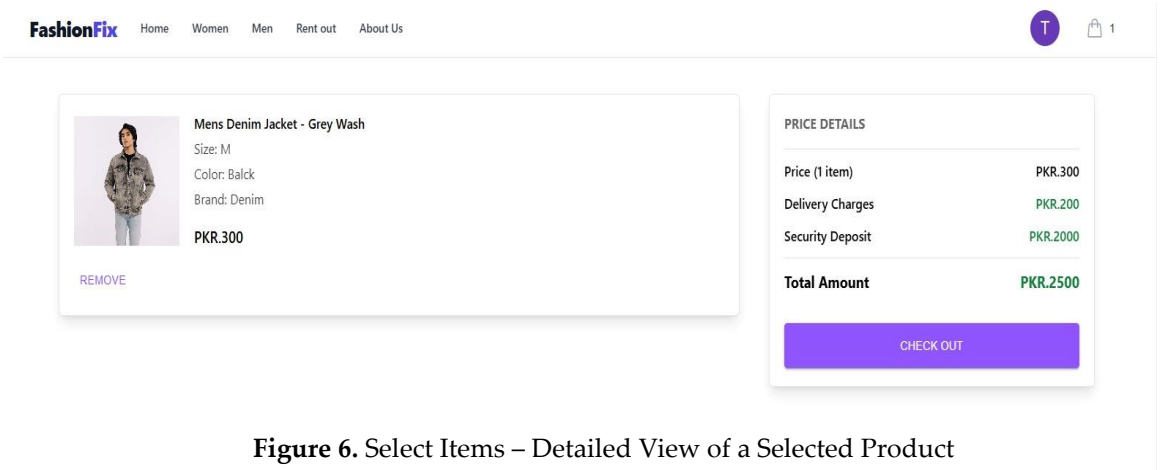

Figure 6. Select Items – Detailed View of a Selected Product

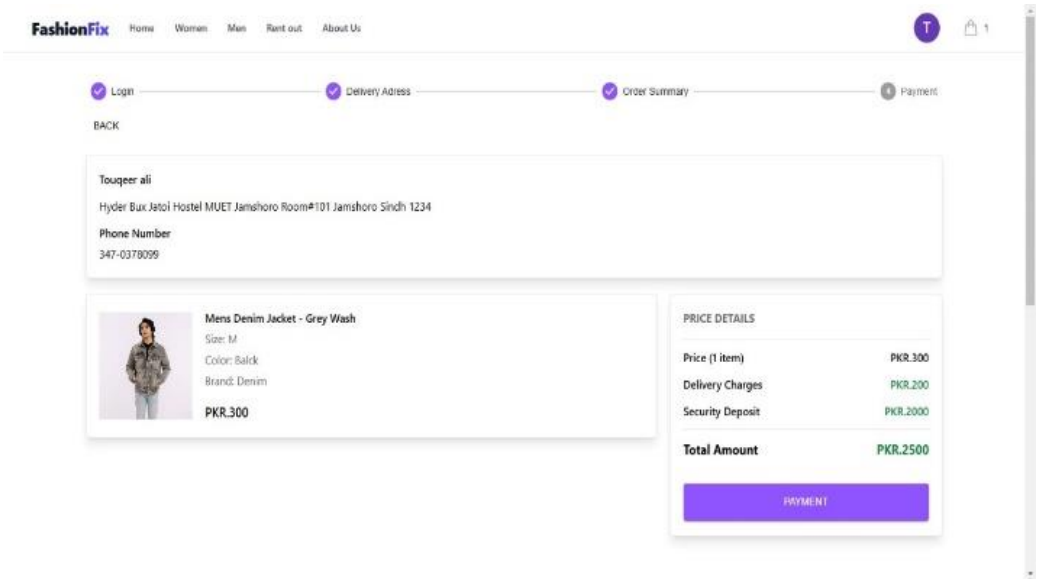

Figure 7. Checkout – Providing Delivery Details

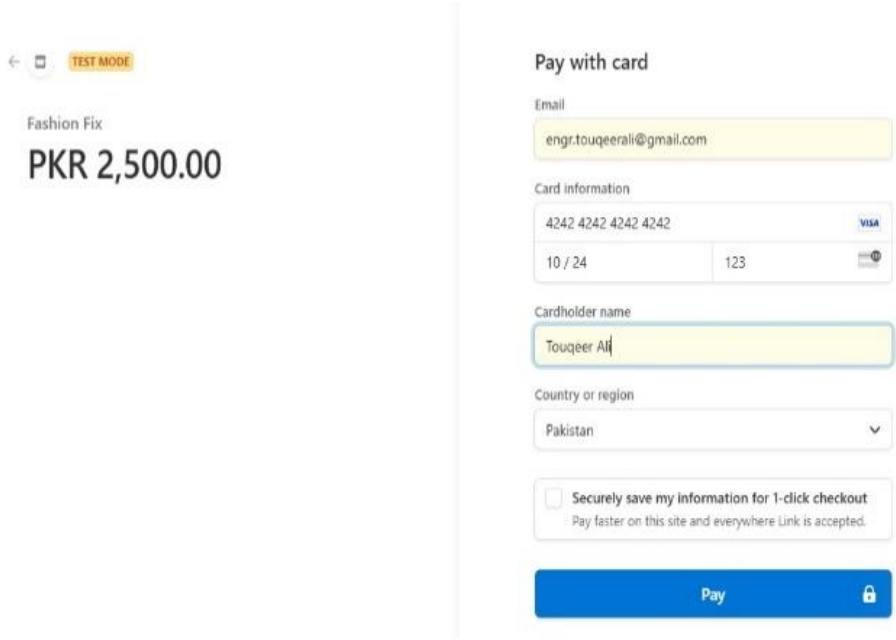

Figure 8. Processing Payment

Figure 9. Order Status – Confirmation and Tracking of Orders

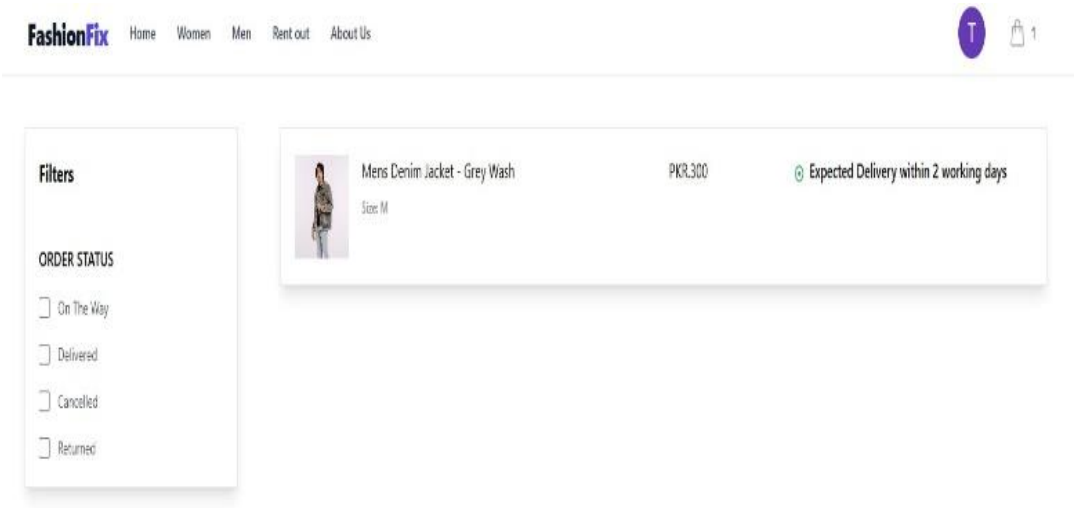

Figure 10. Customer Dashboard – Overview of Orders and Status

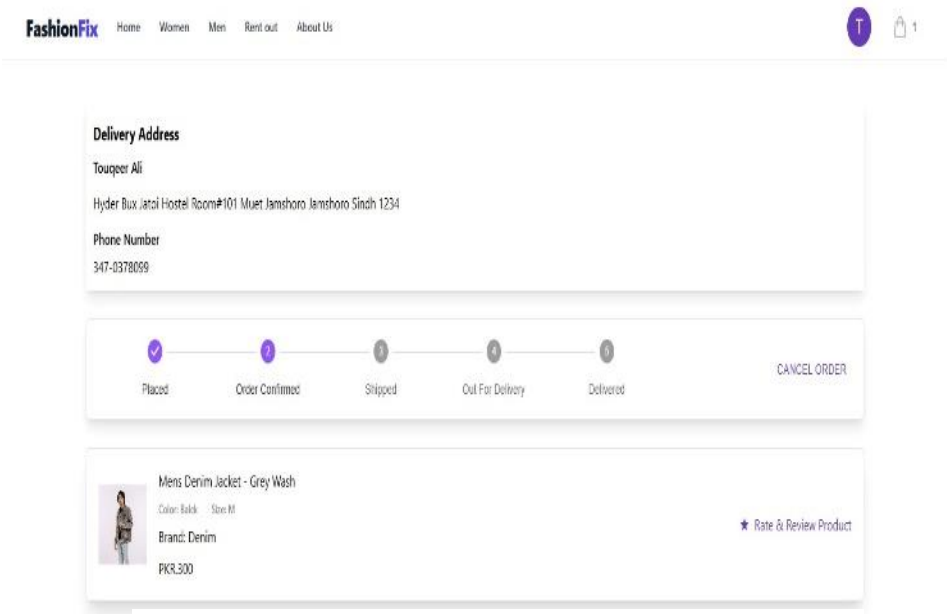

Figure 11. Details of a Particular Item in Customer Dashboard

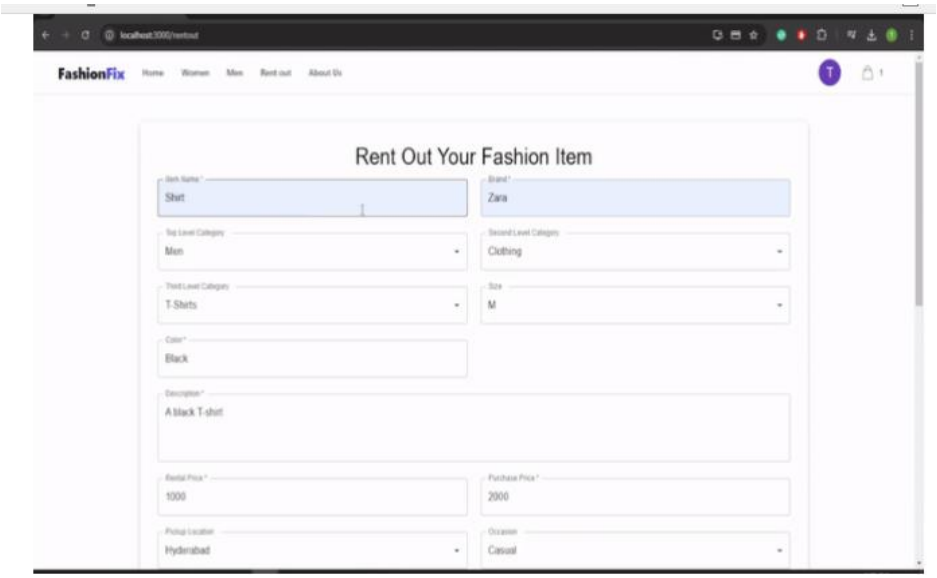

Figure 12. Rent Out Form – Submitting Fashion Items for Rent

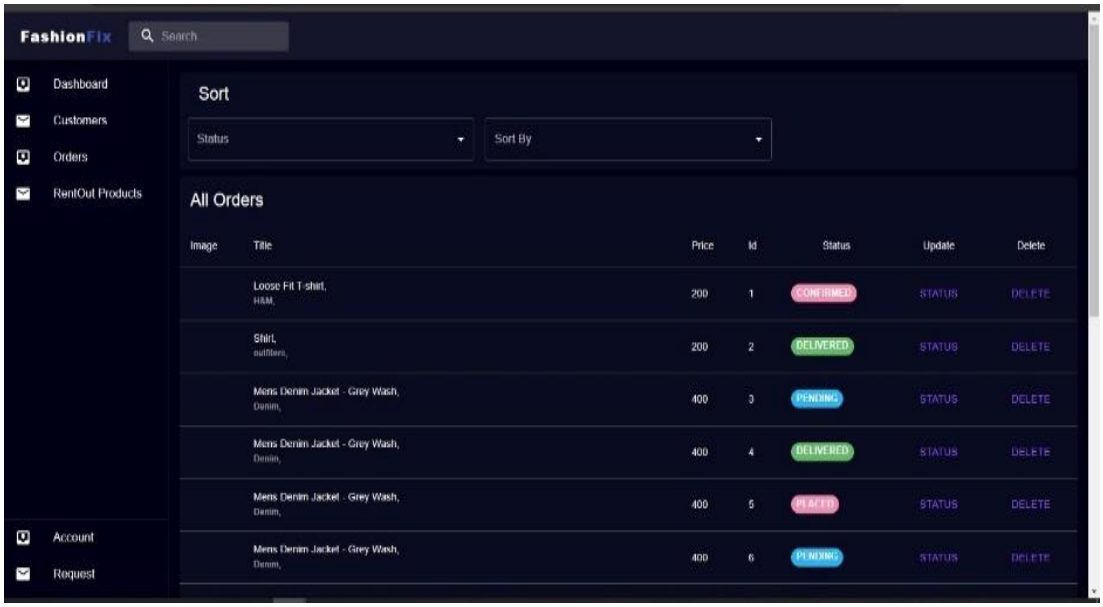

Figure 13. Order Management – Admin Panel for Managing Orders

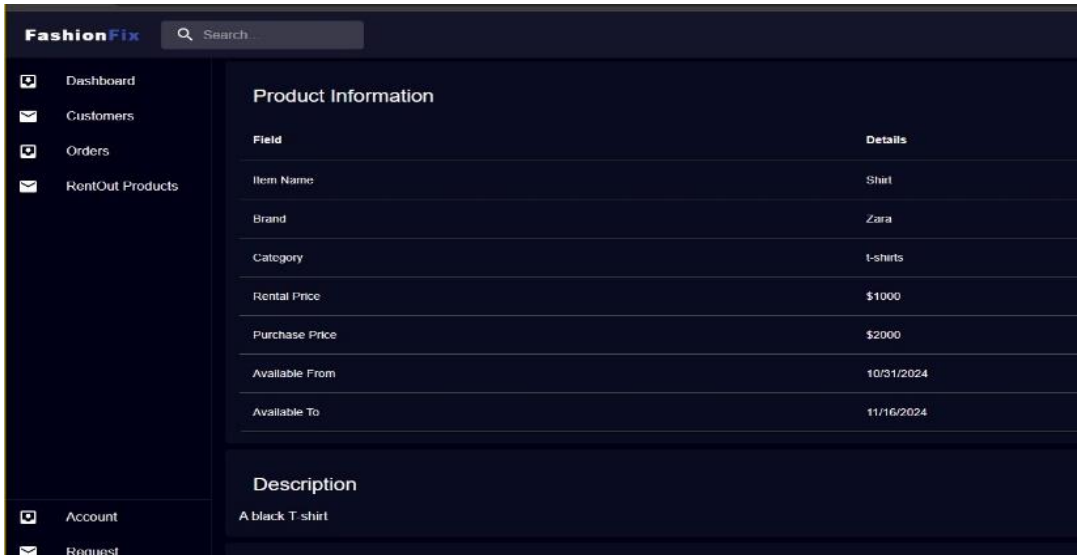

Figure 14. Particular Details of Rent out Product

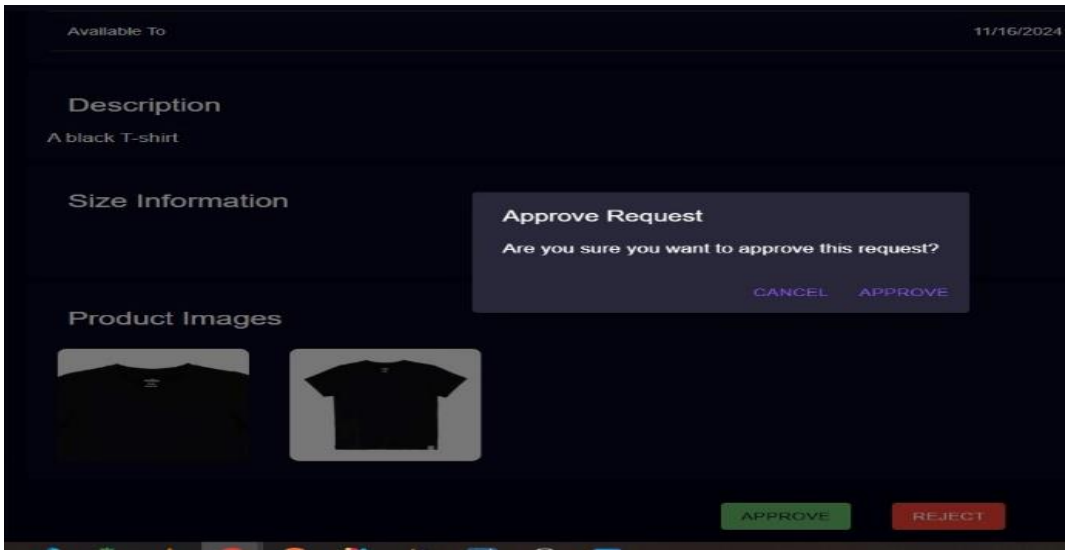

Figure 15. Approve Rent Out

5.1. Features and Functionalities

The homepage is the platform's main entry point, designed for user engagement and easy navigation, featuring a navigation bar linking to key sections such as Login, Signup, Browse Items, and Rent-Out forms, along with a visual carousel for promotions. The customer journey begins with browsing fashion items, filtering them by size, color, and price, and selecting a product to view details like description, pricing, and available sizes. Users can add items to the cart, proceed to checkout by providing delivery details, and make payments securely via the Stripe payment gateway, followed by order status updates. The customer dashboard allows users to view current and past orders, along with their statuses such as Confirmed, Shipped, and Delivered. Customers can also rent out unused fashion items by submitting a Rent-Out form with item details, price, and availability, which are then shown in their dashboard under "My Rent Outs" with status updates. Admin features include order management where administrators can track customer orders and update their statuses to Confirmed, Shipped, or Delivered. This system ensures a seamless experience for both renters and lenders while keeping the admin in control of overall order flow. Furthermore, the admin panel allows administrators to review, approve, or reject rent-out item submissions after evaluating their quality and compliance. Once approved, the items become available on the platform for users to rent.

5.2. Results of User Testing across various Categories

User testing was used to determine the usability, accessibility, and performance of the platform for various demographics. The most important objective was to determine the extent to which users from different backgrounds would be able to use the platform and perform tasks such as browsing items, making orders, or renting out fashion items. It gave very useful insights into improving the overall user experience of the platform.

Table 1. User Testing Results

User Category	Task Success Rate (%)	Avg. Task Completion Time (min)	User Feedback (out of 5)
Working Professionals	95%	3.2	4.5
Housewives	85%	4.5	4.2
Students	90%	3.8	4.7
Old Citizens	70%	6.0	3.8

The table 4.1 is a summary illustrates the results achieved from user testing with participants classified into different categories, working professionals, housewives, students, and senior citizens. Metrics involved in the evaluation include task success rate, average time taken to perform a task, and opinions from the users. The results reveal that students had the highest task success rate (95%) and the shortest average task completion time (3.8 minutes), suggesting a strong alignment between the platform's design and their tech-savvy nature. Working professionals also performed well, citing satisfaction with the intuitive design and seamless payment integration. Housewives appreciated the detailed product pages but suggested more simplified navigation for faster task completion. Senior citizens, although able to complete tasks successfully in most cases, required more time and faced some challenges in navigation, indicating a potential area for improvement.

6. Conclusion

The Affordable Web-Based Fashion Sharing Platform represents a giant leap in the solution of key challenges faced by the fashion industry, namely, sustainability, affordability, and accessibility. This will provide a space for users to share and rent out their fashion items, allowing responsible consumption of fashion goods that would eventually reduce the effects on the environment from unused fashion goods. Giving the power to users to make money off of items that otherwise will go to waste, access to affordable fashionable clothing fills the gap in the provision of accessibility and sustainability in the world of fashion. The platform features all the functionalities of seamless functionality, including safe payment integration via Stripe, easy user interfaces, and customized dashboards for customers and administrators. This brings a seamless customer journey from browsing fashion products through managing orders, while the

administrator can also simply manage orders and rent-out approvals very easily. This user-centric design will achieve excellent experience for all stakeholders, thereby creating trust and engagement. Testing is conducted Apache JMeter proves to be rigorous tests that make sure the high availability of the system under different contexts. Such efforts show strong technical prowess and readiness in real-world usage. Some features, like its monolithic architecture, which relies exclusively on Stripe for payments, seem to present great opportunities for subsequent development: it could have a more scalable microservices approach, have diverse payment options, or even have strong analytics and recommendation capabilities on top of it. In conclusion the above research is based on technological efficiency, fulfills the sustainability goals of the fashion industry. The platform for a new scale-based solution promotes eco-friendly consumption, which is a foundation and basis for future advancements of creating a more sustainable and inclusive fashion-sharing economy.

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