International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 03 | March - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

# A Review of Fifty-Five Streetwear (Clothing Website)

**Rehan Riyaz Dhamaskar**
Information Technology
Finolex Academy of Management and Technology Ratnagiri

**Kashish Siraj Kazi**
Information Technology
Finolex Academy of Management and Technology Ratnagiri

**Saniya Rafique Kapadi**
Information Technology
Finolex Academy of Management and Technology Ratnagiri

**Prof. Amar Palwankar**
Information Technology
Finolex Academy of Management and Technology
Ratnagiri, India

Abstract— The rapid expansion of the e-commerce fashion industry has increased the demand for intelligent online shopping systems that offer personalized, interactive, and reliable user experiences while maintaining efficient backend operations. Although existing e-commerce platforms incorporate features such as recommendation systems, inventory management, and improved website design, these components are often implemented independently, resulting in fragmented user experiences and limited decision support. In particular, the lack of real-time assistance and realistic product visualization remains a significant challenge for appearance-sensitive products such as clothing. This paper presents FIFTY FIVE, an integrated online shopping platform developed as a project-based research study. The proposed system combines AI-driven personalization, real- time chatbot assistance, and an AI-based virtual try-on feature that enables users to customize their appearance and visualize products before purchase. The platform follows a backend- focused, API-based architecture, with MongoDB used for managing users, products, and orders. An administrative module supports effective system management and operational control. By integrating intelligent user interaction with a scalable backend architecture, the proposed system bridges the gap between advanced technological capabilities and seamless user experience, contributing to the development of modern, user-centric e-commerce platforms.

Keywords—

E-commerce, Online Shopping Website, Artificial Intelligence, Chatbot Assistance, Virtual Try-On, Personalization, Backend Architecture

## I. INTRODUCTION

The rapid digital transformation of the global retail sector has fundamentally reshaped how consumers discover, evaluate, and purchase products. E-commerce platforms have evolved from simple online catalogs into complex socio-technical systems that integrate data-driven personalization, real-time interaction, and intelligent decision support. This evolution has been accelerated by widespread internet penetration, mobile device adoption, and changing consumer expectations that prioritise convenience, speed, and personalization. As a result, online shopping is no longer merely an alternative to

physical retail but a dominant mode of commerce that continues to redefine consumer–business relationships.

In an ideal digital retail environment, an online shopping platform should replicate and in some aspects exceed the experience of physical shopping. Such a system would allow users not only to browse and purchase products efficiently but also to receive immediate assistance, personalised guidance, and realistic visualisation of products prior to purchase. It would support informed decision-making, reduce uncertainty, and foster trust between consumers and sellers. However, despite significant technological progress, many contemporary e- commerce systems fall short of this ideal. Users frequently encounter impersonal interfaces, delayed or inadequate customer support, and limited means of assessing product suitability, particularly for appearance-sensitive goods such as clothing and accessories.

This gap between the ideal and the actual experience constitutes a critical problem in modern e-commerce. Existing platforms largely rely on static product images, textual descriptions, and conventional filtering mechanisms, which are insufficient to address user hesitation and dissatisfaction. The absence of interactive assistance often leaves users without guidance during the purchasing process, while the inability to visualise products in a personalised context contributes to high return rates and reduced customer confidence. These shortcomings not only affect user experience but also have direct commercial consequences, including lost sales, increased operational costs, and weakened brand loyalty.

Previous studies and system implementations have attempted to address aspects of this problem through recommendation systems, rule-based chat support, and enhanced user interface design. Research on AI-driven recommender systems has shown promise in improving product discovery by analysing user

behaviour and preferences. Similarly, chatbot-based customer service solutions have been introduced to provide basic query resolution and transactional support. More recently, virtual try- on technologies using augmented reality and computer vision have been explored to enhance produ visualisation. However, these efforts are often fragmented, limited in scope, or constrained by high computational complexity and lack of integration with core e-commerce workflows. Many existing solutions focus on isolated functionalities rather than a cohesive, user-centric system that combines intelligence, interaction, and backend efficiency.

The consequences of these limitations extend beyond individual user dissatisfaction. Indirectly, they contribute to reduced adoption of advanced e-commerce features, reinforce user mistrust in online purchases, and hinder the scalability of intelligent retail systems, particularly in resource-constrained or backend-focused implementations. From a theoretical perspective, there remains a lack of practical system-level studies that examine how conversational AI and AI-based visualisation

## II. PROJECT OVERVIEW AND BACKGROUND

The fashion industry has witnessed rapid digitalization due to technological advancements and changing consumer expectations. Traditional e-commerce platforms introduced features such as online catalogs, recommendation engines, and secure payment systems. However, these systems often operate independently, resulting in fragmented workflows and inconsistent user experiences.

The background of this project originates from the need to bridge the gap between physical shopping experiences and digital retail environments. In physical stores, customers receive personalized assistance, try products before buying, and interact with sales representatives. Online platforms frequently lack these interactive elements.

The FIFTY FIVE system aims t

o recreate these advantages digitally through:

- AI-driven personalization mechanisms.
- Real-time conversational chatbot assistance.
- AI-based virtual try-on visualization.
- Backend API-driven architecture.
- Administrative monitoring and management modules.

The system adopts a holistic design philosophy where frontend interaction and backend efficiency operate together rather than independently. This integrated approach addresses the common problem where systems are either technically sophisticated but experientially limited, or user-friendly but operationally constrained. The present study directly addresses this identified gap by proposing an integrated e-commerce framework. This framework combines chatbot-assisted interaction, AI-based virtual try-on functionalities, and a robust backend-focused API architecture. By synthesizing recent advances in personalization, visual decision support, and system design, this research extends prior work and contributes a holistic approach to intelligent online fashion retail, aiming to bridge the divide between advanced technical capabilities and a seamless user experience.

can be integrated within a unified, scalable e- commerce architecture while maintaining simplicity, security, and performance.

This study addresses this gap by presenting the design and development of FIFTY FIVE, an intelligent online shopping platform that integrates chatbot assistance and AI-based virtual try-on within a backend-focused, API-driven architecture. Unlike prior work that treats these features as standalone enhancements, this research adopts a holistic system design approach, aligning intelligent user interaction with robust backend management and data handling. By grounding the implementation in real-world constraints and user-centric design principles, the study contributes both practically and conceptually to the evolving discourse on intelligent ecommerce systems. It builds upon existing research in conversational interfaces and virtual visualisation while addressing their limitations through integration, scalability, and applied system design.

## III. OBJECTIVES AND SCOPE

Objectives

- To design and develop an intelligent clothing e-commerce platform.
- To enhance user engagement through personalized recommendations.
- To implement chatbot-based real-time customer support.
- To integrate AI-based virtual try-on technology for product visualization.
- To develop a scalable and secure backend architecture.
- To reduce product return rates by improving purchase confidence.
- To enable efficient administrative control over products and orders.

**Scope**

The project focuses primarily on fashion and streetwear e-commerce platforms. The system can be extended in the future to include:

- Mobile application integration.
- Augmented Reality (AR) enhancements.
- Advanced recommendation analytics.
- Multi-vendor marketplace support.

The platform is scalable and suitable for both small startups and large online retail systems.

## IV. LITERATURE REVIEW

The rapid expansion of the e-commerce fashion sector has intensified the need for intelligent systems capable of delivering personalized user experiences while simultaneously optimizing operational efficiency across complex supply chains. While recent research has addressed individual components of this challenge such as recommendation accuracy, inventory optimization, and website usability these efforts often remain fragmented, limiting their comprehensive effectiveness in real-world deployments.

In the domain of personalized fashion recommendation, Strain and Olszewska introduced an interactive AI-based personal stylist utilizing a Naive Bayesian Network to model user preferences under uncertainty. Their approach demonstrated that probabilistic reasoning can effectively handle subjective fashion choices and sparse datasets, offering a scalable solution for early-stage personalization. However, this system relies on predefined attributes and lacks visual compatibility analysis, thereby preventing users from contextualizing recommendations in relation to their own appearance. Given that contemporary consumers increasingly demand visual assurance prior to purchase, the absence of integrated visualization mechanisms significantly constrains the practical impact of such systems.

From an operational perspective, supply chain–focused studies by Cai et al. and Rathnasiri et al. have examined inventory coordination, contract design, and cost-sharing mechanisms within e-commerce environments. These studies provide valuable theoretical insights into risk management, efficiency optimization, and decision-making under uncertainty. Nevertheless, their frameworks are predominantly backend-centric and often assume large-scale or information-rich

environments, which limits their applicability to smaller or user-centric platforms. More

importantly, these works do not adequately consider how backend intelligence can be seamlessly aligned with front-end

personalization and real-time user interaction, thus creating a disconnect between operational optimization and the customer experience.

Website design and user experience have also been explored as critical determinants of customer engagement and loyalty. Sunarmie et al. identified intuitive navigation, aesthetic coherence, mobile responsiveness, and personalization as key drivers of e-commerce success, emphasizing the role of advanced technologies such as artificial intelligence and augmented reality in shaping modern shopping experiences. While this work highlights essential design principles, it remains largely qualitative and does not propose a system-level framework for integrating intelligent assistance and personalization into functional e- commerce architectures. Similarly, Fu et al. investigated optimization strategies in decentralized e-commerce supply chains, focusing on commission-based consignment contracts. Although their findings advance understanding of multi-agent optimization, they operate independently of user- facing considerations, reinforcing the separation between backend efficiency and experiential design.

Taken collectively, the existing literature reveals a persistent and critical gap in the comprehensive integration of intelligent recommendation, real-time conversational assistance, visual personalization, and backend scalability within a single, coherent e-commerce system. Prior studies tend to optimize isolated components rather than addressing the end-to-end user journey and the unified system architecture required for practical deployment. This fragmentation often results in platforms that are either technically sophisticated but experientially limited, or user- friendly but operationally constrained.

## V. COMPARATIVE ANALYSIS

Table I: Comparative Analysis of E-Commerce Systems

| Feature | Strain & Olszewska (2020) | Cai et al. (2022) | Sunarmie et al. (2024) | Proposed System (FIFTY FIVE) |
|---|---|---|---|---|
| Focus Area | Fashion recommendation | Supply chain optimization | Website UX design | Intelligent e-commerce system |
| Personalization | Attribute-based | Not user-centric | UX-level | AI- driven personalization |
| Visual Try-On | Not supported | Not addressed | Conceptual only | AI-based virtual try-on |
| Chatbot Assistance | Not available | Not available | Not implemented | Real- time chatbot support |
| Backend Integration | Limited | Strong (backend only) | Weak | Strong (API-based) |
| System Integration | Standalone | Backend-centric | UX-centric | End-to- end integrated |
| Key Limitation | No visual assurance | Poor UX linkage | Lacks system integration | — |

## VI. CHALLENGES

Despite significant technological advancements, contemporary e-commerce systems continue to face critical challenges in bridging the gap between an ideal digital retail experience and current practical realities.

### A. Impersonal User Interfaces and Limited Interaction

Many existing platforms still rely on impersonal interfaces that fail to replicate—or exceed—the personalized and interactive experience of physical shopping. While some systems provide basic recommendation mechanisms, the absence of real-time conversational assistance limits user engagement and restricts the development of adaptive, personalized shopping journeys.

### B. Inadequate Product Assessment

For appearance-sensitive products such as clothing, most platforms depend on static images and textual descriptions. Prior studies either lack visual assurance mechanisms or discuss virtual try-on only at a conceptual level, offering limited support for realistic product evaluation. This shortcoming contributes to increased user hesitation and elevated return rates.

C. Fragmented Technological Solutions

Although advances have been made in areas such as AI-driven recommendation systems, supply chain optimization, and user interface design, these technologies are frequently developed as standalone solutions. Such fragmentation prevents the emergence of cohesive, user-centric platforms that integrate intelligence, interaction, and backend efficiency.

D. Lack of Integrated System Design

There remains a notable absence of practical, system-level studies that examine how conversational AI and AI-based visualization can be effectively integrated within a unified, scalable e-commerce architecture. Existing approaches either focus on isolated features or prioritize backend optimization without sufficient attention to system integration.

E. Operational and User Experience Disconnect

Backend-centric solutions often remain detached from user-facing experiences, while user-oriented enhancements lack deep integration with core e-commerce workflows. This disconnect reduces adoption of advanced features, reinforces consumer mistrust, and limits the scalability of intelligent retail systems.

## V. PROPOSED SYSTEM

A. Problem Statement

Despite technological advancements, modern clothing e-commerce platforms face several challenges:

- Lack of personalized shopping experiences.
- Limited customer assistance during purchase decisions.
- Dependence on static images for product evaluation.
- Fragmented system architectures.
- High product return rates due to poor visualization.
- Weak integration between intelligent technologies and operational workflows.

These limitations reduce customer satisfaction and negatively impact business performance.

B. Proposed Solution

The proposed solution introduces an integrated intelligent shopping platform that combines multiple advanced technologies:

Key Features

- AI Personalization Engine: Recommends products based on user behavior and preferences.
- Chatbot Assistance: Provides instant responses to customer queries and guides purchasing decisions.
- Virtual Try-On System: Allows users to visualize clothing items on customized avatars.
- API-Based Backend: Ensures scalability and efficient communication between modules.
- Admin Dashboard: Enables inventory management, order tracking, and analytics.

The integration of these features creates a seamless shopping journey from product discovery to purchase completion.

## VI. METHODOLOGY AND ALGORITHMS

The system follows a structured software development methodology consisting of analysis, design, implementation, testing, and deployment phases.

A. Methodology

The development process follows these stages:

1. Requirement analysis and system planning.
2. UI/UX design for user interaction.
3. Backend API development.
4. Database schema creation.
5. AI module integration.
6. Testing and performance evaluation.
7. Deployment and monitoring.

B. Algorithms Used

1) Recommendation Algorithm

The recommendation algorithm analyzes browsing history, purchase patterns, and user preferences to suggest relevant products. The algorithm employs collaborative filtering and content-based filtering techniques to generate personalized product recommendations.

Algorithm 1: Product Recommendation
Input: User browsing history, purchase history, preferences Output: List of recommended products

1: Extract user behavior data
2: Compute similarity scores with other users 3: Identify products liked by similar users
4: Apply content-based filtering on product attributes 5: Merge and rank recommendations
6: Return top N products

2) Chatbot Algorithm

The chatbot uses rule-based and AI conversational logic to interpret user queries and generate responses. Natural language processing techniques are employed to understand user intent and provide contextually appropriate assistance.

Algorithm 2: Chatbot Response Generation Input: User query text
Output: Appropriate response

1: Preprocess and tokenize user input
2: Identify intent using NLP classification
3: Extract entities (product names, categories, etc.) 4: IF intent = product_query THEN
5: Fetch product details from database 6: ELSE IF intent = order_status THEN 7: Retrieve order information
8: ELSE
9: Use rule-based or AI response generation 10: Format and return response

3) Virtual Try-On Processing
The virtual try-on module applies image mapping and visualization techniques to simulate clothing appearance on user-customized avatars. Computer vision algorithms process product images and overlay them onto avatar representations.
Algorithm 3: Virtual Try-On
Input: User avatar image, product image Output: Combined visualization

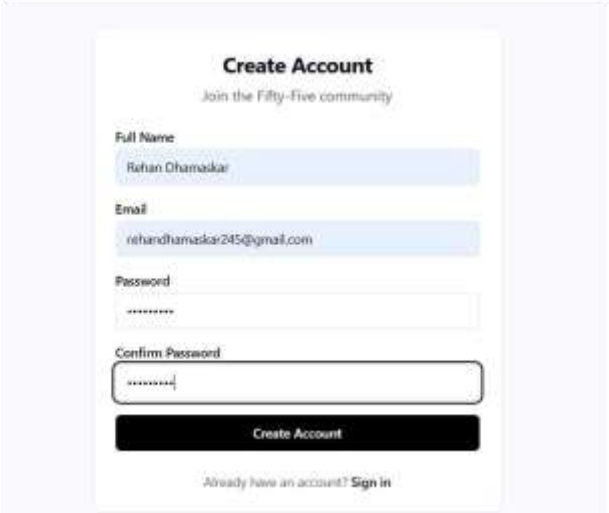
1: Load user avatar and product image 2: Detect key body landmarks on avatar
3: Extract product dimensions and features
4: Apply perspective transformation to product
5: Overlay product onto avatar at detected landmarks 6: Blend edges for realistic appearance
7: Return final visualization
4) Database Query Optimization
Efficient indexing and querying mechanisms improve system response time. MongoDB's document-based structure enables flexible schema design and rapid data retrieval for real-time operations.

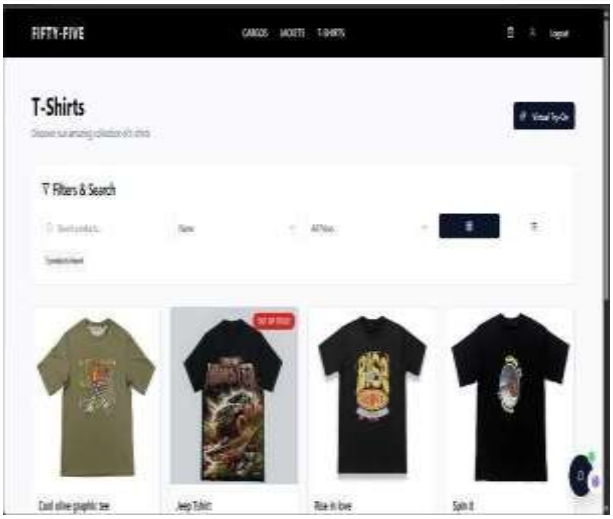
## VII. IMPLEMENTATION RESULTS

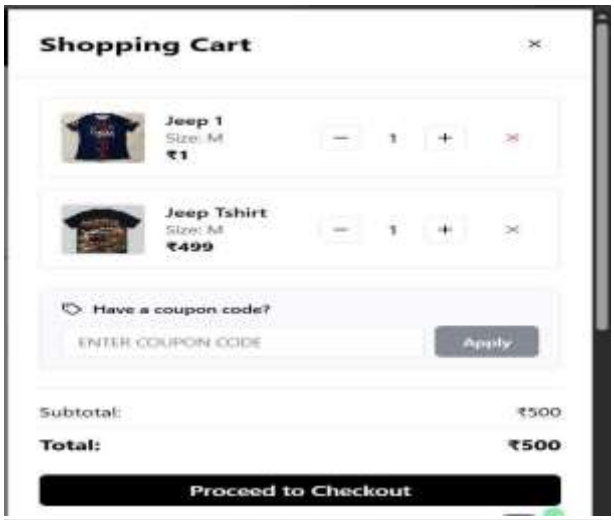
A. Visual Implementation Results The implemented system provides:

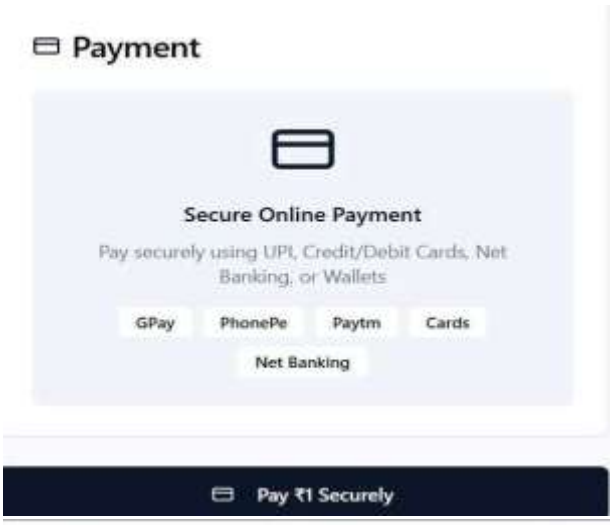
- Modern responsive website interface.
- Personalized product display.
- Chatbot interaction window.
- Virtual try-on visualization.
- Smooth navigation and product filtering.

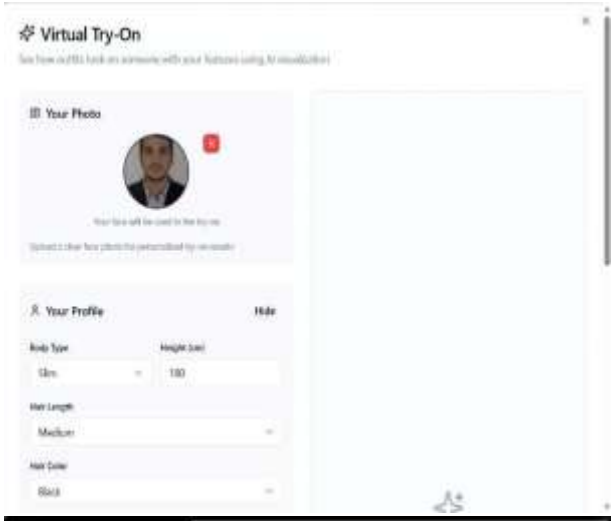
User testing indicates improved engagement and better purchasing confidence compared to traditional systems.

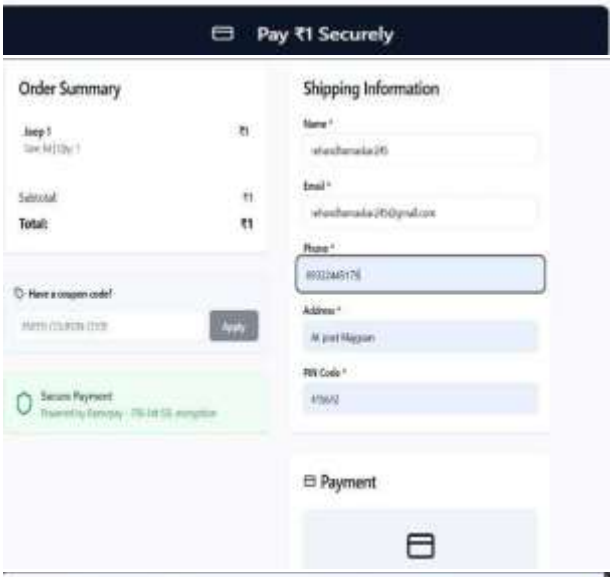



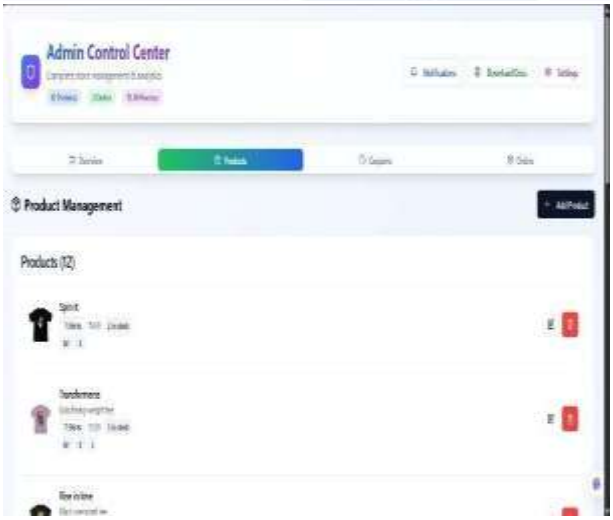

Shopping Cart
Jeep 1
Size: M
₹1
Jeep Tshirt
Size: M
₹499
Have a coupon code?
ENTER COUPON CODE
Apply
Subtotal: ₹500
Total: ₹500
Proceed to Checkout

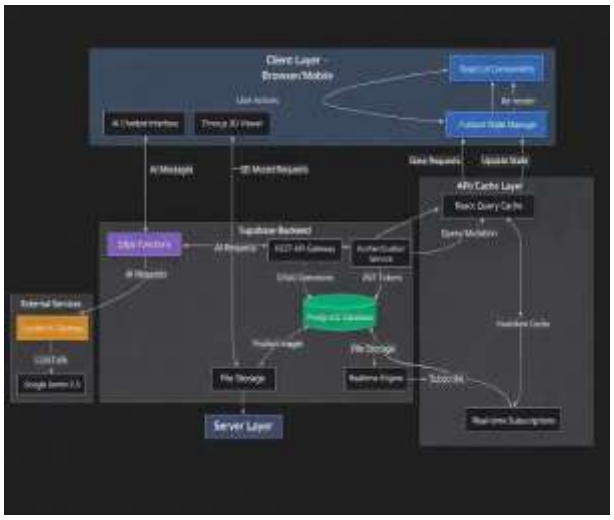

Payment
Secure Online Payment
Pay securely using UPI, Credit/Debit Cards, Net Banking, or Wallets
GPay
PhonePe
Paytm
Cards
Net Banking

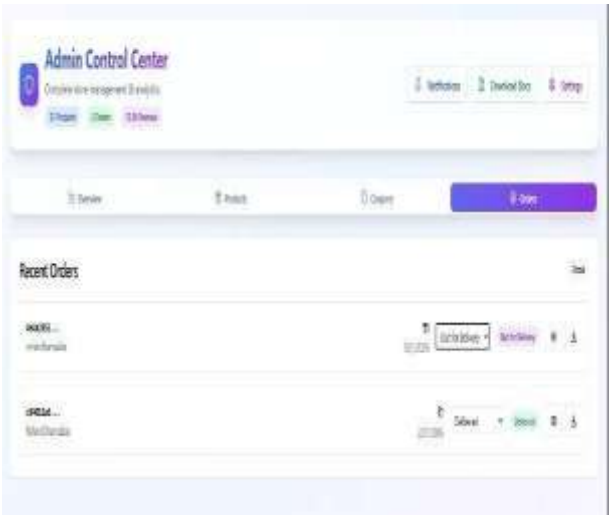

Virtual Try-On
Your Photo
Your Profile
Hide

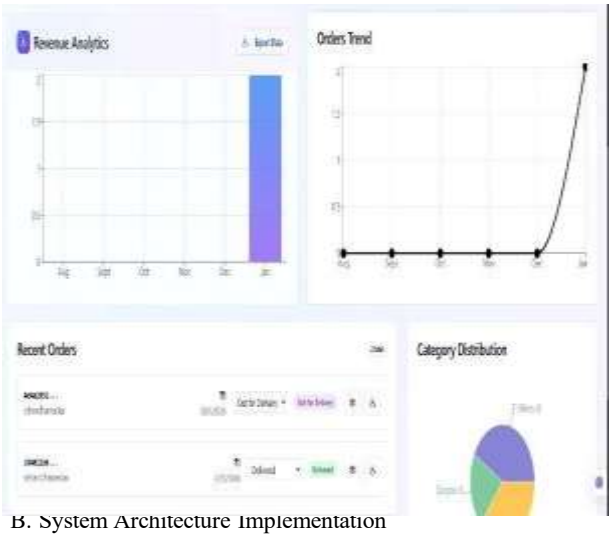

Pay ₹1 Securely
Order Summary
Shipping Information
Total: ₹1
Payment


Fashion Store
Price Summary
₹1
Payment Options
Recommended
UPI
Cards
Netbanking
Wallet


Admin Control Center
Product Management
Products (12)




B. System Architecture Implementation

The architecture follows a modular layered structure:

- Presentation Layer: User interface and interaction.
- Application Layer: Business logic and APIs.
- AI Layer: Personalization and chatbot modules.
- Database Layer: Data storage and management.

This architecture supports scalability, maintainability, and efficient performance.

C. Database Implementation

MongoDB is used as a NoSQL database due to flexibility and scalability.

Collections Include:

- Users
- Products
- Orders
- Admin data
- Chat history

The database supports real-time updates and secure data handling.

## VII DISCUSSION

A. Technical Achievements

The FIFTY FIVE platform successfully integrates multiple advanced technologies within a unified architecture. The AI- driven personalization engine demonstrates effective product recommendation based on user behavior analysis. The chatbot assistance module provides real-time support with natural language understanding capabilities. The virtual try-on feature offers realistic product visualization, addressing a critical gap in online clothing retail.

The API-based backend architecture ensures modularity and scalability, enabling independent development and deployment of individual components. MongoDB's document-oriented structure supports flexible data models and efficient query performance for real-time operations.

B. Pedagogical Achievements

From a research and educational perspective, this project demonstrates the practical integration of theoretical concepts in artificial intelligence, software engineering, and e-commerce systems. The holistic approach to system design emphasizes the importance of aligning user-facing features with backend efficiency, providing valuable insights for future intelligent retail platforms.

C. Limitations and Future Work

While the current implementation demonstrates significant capabilities, several areas remain for future enhancement:

- Mobile Application: Development of native mobile applications for iOS and Android platforms.
- Augmented Reality: Integration of AR technology for immersive try-on experiences.
- Advanced Analytics: Implementation of predictive analytics for inventory optimization.
- Multi-vendor Support: Extension to marketplace architecture supporting multiple sellers.
- Performance Optimization: Further optimization of AI algorithms for reduced latency.

VIII REQUIREMENT SPECIFICATION

Hardware Requirements

- Processor: Intel i3 or higher
- RAM: Minimum 4GB
- Storage: 20GB free space
- Internet connectivity Software Requirements
- HTML, CSS, JavaScript
- Backend framework (Node.js or equivalent)
- MongoDB database
- API services
- AI integration modules
- Web browser (Chrome/Edge)

IX. RELEVANCE OF THE PROJECT

A. Social Relevance

The FIFTY FIVE platform enhances accessibility to fashion retail by providing intelligent assistance and visualization tools that bridge the gap between physical and online shopping experiences. This democratizes access to quality fashion products, particularly for users in remote areas or with limited access to physical stores.

B. Industrial Relevance

From an industry perspective, the integrated architecture and intelligent features address critical challenges in e-commerce, including high return rates, customer dissatisfaction, and operational inefficiencies. The platform demonstrates a scalable model applicable to various retail sectors beyond fashion.

C. Educational Relevance

This project serves as a comprehensive case study in applied artificial intelligence, software engineering, and user-centric design. It demonstrates the practical application of theoretical concepts and provides valuable learning experiences in system integration, API design, and intelligent application development

X. SUSTAINABLE DEVELOPMENT GOALS (SDGs)

The FIFTY FIVE project aligns with several Sustainable Development Goals:

SDG 8: Decent Work and Economic Growth

- Supports digital entrepreneurship and online business opportunities.
- Enables small fashion retailers to reach broader markets through intelligent platform features.

SDG 9: Industry, Innovation, and Infrastructure

- Demonstrates innovative application of AI technologies in e-commerce.
- Contributes to digital infrastructure development for online retail.

SDG 12: Responsible Consumption and Production

- Reduces product returns through better visualization and informed purchasing decisions.
- Minimizes waste associated with unsuitable product purchases.

XI CONCLUSION

In summary, the current e-commerce landscape is characterized by a significant disparity between the ideal of a fully immersive, intelligent shopping experience and the limitations of fragmented platform designs. This study addresses this gap through the design and development of FIFTY FIVE, an integrated online shopping platform that unifies AI-driven personalization, AI-based virtual try-on, and real-time chatbot assistance within a robust, API-based backend architecture. Unlike prior approaches that treat these capabilities as independent enhancements or backend-only optimizations, FIFTY FIVE adopts a holistic system design perspective. By aligning intelligent user interaction with comprehensive backend management and data handling, this research contributes both practically and conceptually to the advancement of intelligent e-commerce systems, improving user satisfaction while enhancing operational effectiveness.

REFERENCES

[1] Rahul Sharma, Neha Verma, "E-Commerce Website for Online Clothing Shopping," *International Research Journal of Engineering and Technology (IRJET)*, vol. 09, issue 05, pp. 1123–1127, May 2022.

[2] Aditi Kulkarni, Rohit Patil, Prof. S. P. Kulkarni, "Design and Development of Online Fashion Store," *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, vol. 8, issue 3, pp. 421–426, 2022.

[3] Sneha More, Pratiksha Jadhav, Akshay Pawar, "Online Clothing Store Using Web Technologies," *International Journal of Creative Research Thoughts (IJCRT)*, vol. 10, issue 2, pp. 356–360, February 2022.

[4] Aman Verma, Riya Gupta, "E-Commerce Website for Fashion Products," *International Journal of Advanced Research in Computer Science*, vol. 13, issue 4, pp. 98–102, 2022.

[5] Sahil Shaikh, Faizan Khan, Arbaz Shaikh, "Online Shopping System for Apparel Industry," *International Research Journal of Engineering and Technology (IRJET)*, vol. 08, issue 06, pp. 1450–1454, June 2021.

[6] Neha Patil, Snehal Deshmukh, Prof. R. S. Patil, "Web Based Clothing Management System," *International Journal of Innovative Research in Technology (IJIRT)*, vol. 7, issue 9, pp. 211–215, 2021.

[7] Rohit Mehta, Kunal Shah, "E-Commerce Website Using HTML, CSS, JavaScript and Database," *International Journal of Emerging Technology and Advanced Engineering*, vol. 11, issue 3, pp. 54–59, March 2021.

[8] Anjali Singh, Priyanshu Mishra, "Online Shopping System with Admin and User Module," *International Journal of Computer Applications*, vol. 176, issue 39, pp. 22–26, 2020.

[9] Swapnil Patil, Tejas Kulkarni, "Secure Online Shopping Website Using PHP and MySQL," *International Journal of Engineering Research & Technology (IJERT)*, vol. 9, issue 6, pp. 1021–1025, 2020.

[10] Kiran Desai, Rutuja Pawar, "Design and Implementation of Fashion E-Commerce Website," *International Journal of Advanced Science and Technology*, vol. 29, issue 5, pp. 1345– 1351, 2020.

[11] Pooja Bhosale, Sneha Jadhav, Prof. A. R. Mune, "Web Based Shopping Portal for Clothing Store," *International Journal of Advanced Research in Computer Science and Software Engineering*, vol. 8, issue 4, pp. 88–92, 2019