

IJIREEICE

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.414 $\,st\,$ Peer-reviewed & Refereed journal $\,st\,$ Vol. 13, Issue 5, May 2025

DOI: 10.17148/IJIREEICE.2025.13514

Review On: A Comprehensive Fashion Recommendation System

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Abstract: The rapidly evolving fashion industry demands intelligent and personalized recommendation systems to enhance user experiences and promote e-commerce growth. This paper proposes an AI-Based Fashion Recommendation System that utilizes Machine Learning (ML) and Deep Learning (DL) techniques to deliver customized clothing and accessory suggestions. The system is composed of three modules: Admin, User, and Retailer. Through Convolutional Neural Networks (CNNs), clustering algorithms, and behavioral analytics, the platform enhances fashion product discovery, addresses cold start problems, and improves customer engagement.

Keywords: Fashion Recommendation System, Convolutional Neural Network, Machine Learning, Deep Learning, Visual Search, Personalization, E-Commerce.

I. INTRODUCTION

Fashion has evolved as a major industry. With recommendation systems entering various domains, retailers are investing in intelligent technologies to improve visibility and user satisfaction. As appearance becomes an essential aspect of personal branding, fashion recommendation plays a critical role.

A fashion recommendation system is a type of recommendation system that suggests clothing items, accessories, and styles to users based on their preferences, past purchases, and browsing history. These systems aim to personalize the online shopping experience and increase user satisfaction by providing tailored suggestions..

1.1. Need For Fashion Recommendation System

Existing e-commerce platforms face challenges such as information overload, user disinterest due to irrelevant suggestions, and difficulty managing diverse inventories. A recommendation system that understands fashion trends, personal style, and context (season, occasion, etc.) is essential.

This system helps users discover relevant fashion products, enables retailers to showcase items effectively, and provides admins with tools to moderate content and analyze user behavior.

1.2. Research Objectives

In this project, we propose a model that uses Convolutional Neural Network and the Nearest neighbors backed recommender. As shown in the figure Initially, the neural networks are trained and then an inventory is selected for generating recommendations and a database is created for the items in inventory. The nearest neighbor algorithm is used to find the most relevant products based on the input image and recommendations are generated.

II. EXISTING SYSTEM

Most current e-commerce platforms lack intelligent filtering, offer generic suggestions, and suffer from poor personalization. Users face information overload, and retailers struggle to present the right product to the right customer at the right time.

III. PROPOSED SYSTEM

We propose a hybrid AI-based system that includes CNNs for visual analysis and Nearest Neighbor algorithms for similarity matching. The system includes three modules: Admin (management and moderation), Users (profile-based recommendations), and Retailers (catalog upload and analytics).



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IV. METHODOLOGY

Technologies Used:

- Frontend: HTML, CSS, JavaScript
- Backend: Python, Django, FastAPI
- ML Frameworks: TensorFlow, Scikit-learn, Streamlit
- Database: MongoDB, Firebase
- Security: JWT Authentication

The ML pipeline includes image preprocessing, feature extraction using CNNs, clustering, and collaborative filtering.

V. SYSTEM ARCHITECTURE FLOWCHART OF PROJECT

The system consists of three main modules

5.1. Admin Module

Oversees users, retailers, product data, and model training logs.

5.2. User Module

Registers users, tracks browsing behavior, and displays recommendations.

5.3. Retailer module

Allows fashion vendors to list items, update inventory, and monitor analytics.

5.4. Flowchart Of Project







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VI. IMPLEMENTATION & RESULTS

The system provides a user-friendly interface with filtering, swiping, wishlist, and trend analysis. CNN models improve visual recommendations while heatmaps track popular items. Result shows increased user engagement and conversion.



VII. CHALLENGES

- Data diversity and inconsistency
- Cold start issue for new users/products
- Visual similarity accuracy
- UI design adaptability
- System scalability and speed

VIII. FUTURE SCOPE

- Integration of Generative AI for new fashion designs
- Metaverse try-on using avatars
- Voice-based interaction for hands-free browsing
- Mood-based recommendations using Emotion AI
- Emphasis on sustainable, eco-friendly fashion

IX. CONCLUSION

In this project, we have presented a novel framework for fashion recommendation that is driven by data, visually related and simple effective recommendation systems for generating fashion product images. The proposed approach uses a twostage phase. Initially, our proposed approach extracts the features of the image using CNN classifier ie., for instance allowing the customers to upload any random fashion image from any E-commerce website and later generating similar



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images to the uploaded image based on the features and texture of the input image. It is imperative that such research goes forward to facilitate greater recommendation accuracy and improve the overall experience of fashion exploration for direct and indirect consumers alike.

REFERENCES

[1] FastAPI – A modern web framework for APIs in Python

[2] OpenCV – Open Source Computer Vision Library

[3] TensorFlow – ML and Deep Learning framework

[4] Tqdm – Python progress bar utility

[5] Streamlit – Data science web app framework

[6] Pandas – Python data analysis toolkit

[7] Pillow – Python imaging library

[8] Scikit-learn – ML tools in Python[9] HTML, CSS, JavaScript – Frontend web technologies.