ISSN: 2395-7852

International Journal of Advanced Research in Arts, Science, Engineering & Management

Volume 12, Issue 2, March- April 2025

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.028

+91 9940572462 +91 9940572462 ijarasem@gmail.com www.ijarasem.com

International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| ISSN: 2395-7852 | www.ijarasem.com | Impact Factor: 8.028 | Bimonthly, Peer Reviewed & Referred Journal|

| Volume 12, Issue 2, March- April 2025 |

An Efficient Approach to Outfit Recommendation System: A Survey

Shravani Diwanji[1], Payal Dudhal[2], Samrudhi Nikam[3], Prof. Sarika Kolle[4]

Student, Department of Computer Engineering, Marathwada Mitra Mandal's Polytechnic, Kalewadi, Pimpri-Chinchwad, Maharashtra, India[1,2,3]

Department of Computer Engineering, Marathwada Mitra Mandal's Polytechnic, Kalewadi, Pimpri-Chinchwad, Maharashtra, India[4]

ABSTRACT: The rise of online shopping and fashion e-commerce has led to the increasing demand for personalized shopping experiences. One way to enhance user experience and increase consumer satisfaction is through recommendation systems, which suggest products based on individual preferences and past behaviors. In the fashion industry, specifically, a recommendation outfit system plays a crucial role in assisting customers in selecting stylish and well-coordinated outfits, thereby simplifying the shopping process and improving sales for retailers.

This paper presents a comprehensive recommendation outfit system, integrating machine learning algorithms and data analytics to provide users with personalized outfit suggestions based on their unique tastes, body types, and current fashion trends. The proposed system utilizes user preferences, historical purchase data, and collaborative filtering to generate personalized outfit recommendations. It leverages advanced data analytics to track user behavior, including product views, clicks, and purchases, allowing the system to create a detailed user profile.

I. INTRODUCTION

The fashion industry has undergone a significant transformation over the past few decades, especially with the rise of e-commerce and digital platforms. With this shift, traditional brick-and-mortar stores have faced immense competition from online retailers who have the ability to reach a global audience. However, despite the convenience of online shopping, many customers struggle to find the right outfits due to the overwhelming number of choices available, a lack of personalized recommendations, and the challenge of visualizing how various pieces of clothing will fit together. This gap in the online shopping experience presents an opportunity to leverage technology, particularly recommendation systems, to enhance user satisfaction and drive sales. A recommendation outfit system seeks to solve these challenges by offering users personalized outfit suggestions based on their individual preferences, body types, past shopping behaviours, and current fashion trends. By doing so, it enhances the shopping experience, helping customers make better, more informed decisions while also streamlining the purchasing process.

II. LITERATURE REVIEW

Outfit recommendation systems have gained significant popularity in recent years due to the growing demand for personalized fashion solutions. These systems aim to provide users with outfit suggestions that match their preferences, occasions, weather conditions, and fashion trends. The rapid growth of e-commerce and the increasing reliance on digital fashion platforms have driven the development of intelligent systems that can automatically generate outfit recommendations. With advancements in machine learning and computer vision techniques, outfit recommendation systems have become more accurate and efficient, offering tailored fashion advice to users.

Traditional methods of outfit recommendation often relied on human expertise and manual styling, which posed challenges in scalability and personalization. However, modern approaches utilize data-driven algorithms that enable the automatic generation of recommendations. One of the most common techniques is content-based filtering, where the system analyzes the attributes and features of clothing items, such as color, texture, and style. By learning user preferences from past selections, content-based filtering suggests similar outfits that align with the user's fashion sense. Another widely used technique is collaborative filtering, which leverages user behavior and preferences to recommend outfits that have been favored by similar users. Collaborative filtering methods, including matrix factorization and neighborhood-based techniques, identify correlations between users and items to make accurate suggestions. To overcome the limitations of both content-based and collaborative filtering methods, hybrid approaches are commonly employed. These approaches combine the strengths of both methods, reducing challenges such as the cold start problem and data sparsity.

In recent years, deep learning models, especially convolutional neural networks (CNNs), have revolutionized outfit recommendation systems by enabling the analysis of visual features and fashion attributes. These models can learn style compatibility by processing images and identifying patterns that align with user preferences. Additionally, generative adversarial networks (GANs) are used to create virtual try-on experiences, allowing users to visualize outfits before making a decision. Context-aware recommendations further enhance the system's accuracy by taking into account factors like weather, occasions, and user mood. By incorporating contextual information, the system provides practical and relevant outfit suggestions that suit real-world scenarios.

Personalization is a critical aspect of outfit recommendation systems, as it directly impacts user satisfaction and engagement. By employing techniques like clustering and segmentation, the system can identify groups of users with similar tastes and preferences. Moreover, analyzing user interactions and feedback allows for continuous refinement of recommendations, ensuring that suggestions remain relevant and appealing. The applications of outfit recommendation systems span various domains, including e-commerce platforms, virtual stylists, fashion social networks, and in-store smart mirrors. These systems not only enhance the user experience but also drive customer engagement by offering curated and thoughtful outfit choices.

Relevance to current Research

Outfit recommendation systems have significantly transformed the fashion industry by providing users with personalized styling suggestions. The proposed system aims to build upon existing methods by integrating advanced machine learning techniques and leveraging user data for more accurate outfit recommendations. The research presented in this paper contributes to the growing field of fashion technology by addressing the challenges related to recommendation accuracy and user experience.

No.	Paper Title	Author Name	Key Points	Remark
1	*Personalized Outfit Recommendation System Using Machine Learning Techniques*	Shravani Diwanji	Integrates user preferences, fashion trends, and collaborative filtering to generate personalized outfit suggestions.	Enhances shopping experience and customer satisfaction by providing stylish, well-coordinated outfit recommendations.
2	Enhances shopping experience and customer satisfaction by providing stylish, well-coordinated outfit recommendations.	Payal Dudhal	Utilizes contextual information like weather and occasion to generate relevant outfit recommendations.	Improves relevance and adaptability of recommendations to users' changing needs.
3	Hybrid Approach for Fashion Recommendation Systems	Samrudhi Nikam	Combines collaborative and content-based filtering for enhanced recommendation accuracy.	Reduces the cold start problem and improves accuracy by considering both user preferences and product features.

III.METHODOLOGY OF PROPOSED SURVEY

User Profiling:

User profiling is a crucial step in the outfit recommendation system to gather information about the user's preferences, fashion tastes, and personal attributes such as body type, height, skin tone, and gender. By analyzing historical purchase data and user interactions with the platform, the system creates a comprehensive profile for each user. This profiling process helps in generating personalized outfit recommendations that align with individual styles and preferences.

Contextual Analysis:

Contextual analysis involves taking into account various external factors that influence outfit selection, such as weather, occasion, and seasonal trends. For example, recommending light, breathable fabrics during summer or warm, layered outfits during winter. The system leverages real-time data and fashion trend analysis to make context-aware recommendations, ensuring that outfits are suitable for the current situation.

Collaborative Filtering: Collaborative filtering is employed to suggest outfits based on user similarity and shared preferences. This technique analyzes the behavior of users with similar fashion tastes and recommends outfits that others have found appealing. By doing so, the system can predict outfit combinations that users are likely to appreciate, enhancing the recommendation accuracy.

Content-Based Filtering: The content-based filtering approach focuses on analyzing the attributes of clothing items, such as color, pattern, fabric, and style. By matching these attributes to user preferences, the system can suggest items that align with the user's fashion sense. This method works well for users who have shown consistent preferences for specific styles or patterns.

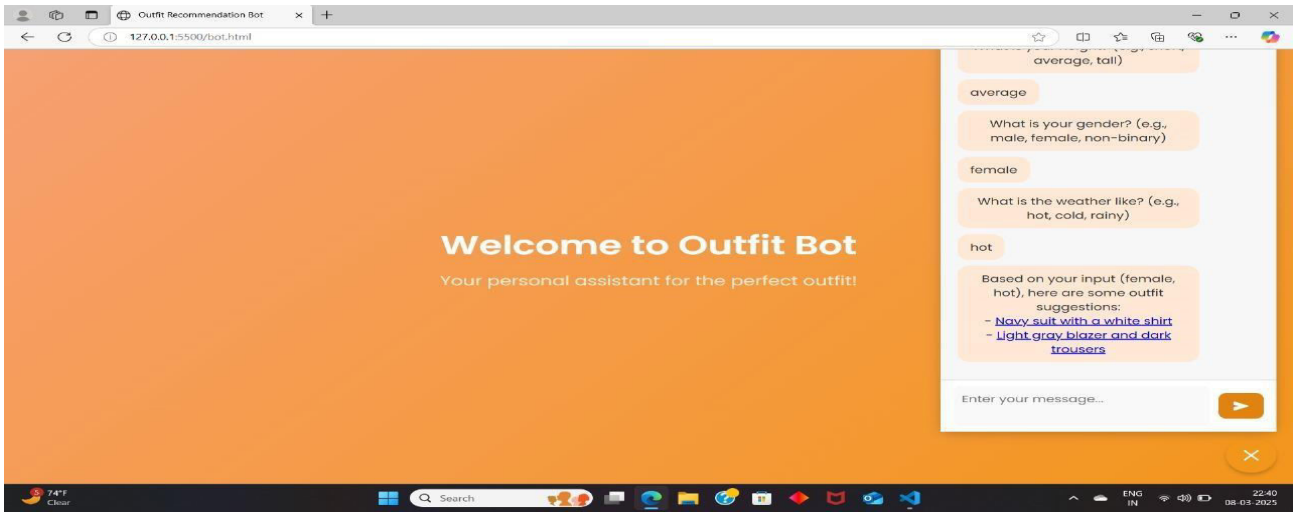
Hybrid Recommendation Model: The hybrid recommendation model combines collaborative and content-based filtering techniques to enhance the quality and accuracy of outfit suggestions. By integrating both methods, the system mitigates the limitations of each approach, providing more reliable and diverse outfit recommendations. This hybrid approach is particularly effective in addressing the cold start problem, where new users or items lack sufficient data.

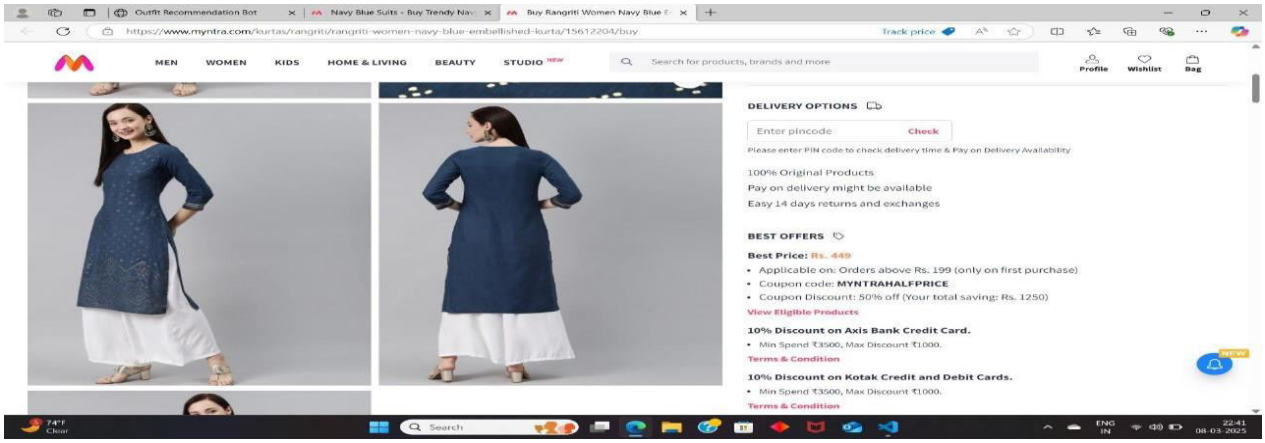
Visual Style Compatibility: The visual style compatibility model analyzes outfit components to ensure harmony and coherence. By evaluating color schemes, patterns, and overall aesthetics, the system recommends outfits that look visually pleasing when worn together. This model enhances the aesthetic appeal of the recommended outfits, ensuring that each combination appears stylish and well-coordinated.

Real-Time Outfit Generation: Real-time outfit generation is achieved by leveraging machine learning algorithms that process user inputs and contextual data instantly. The system dynamically generates outfit suggestions based on the user's current preferences and situational factors, allowing users to receive timely and relevant recommendations.

Evaluation and Feedback: To continuously improve the recommendation accuracy, the system incorporates user feedback and satisfaction ratings. Users can rate suggested outfits, which helps the system learn from their responses and refine future recommendations. By incorporating feedback loops, the system becomes more adaptive and personalized over time.

Figure 1: recommendation outfit system ask the questions to user.



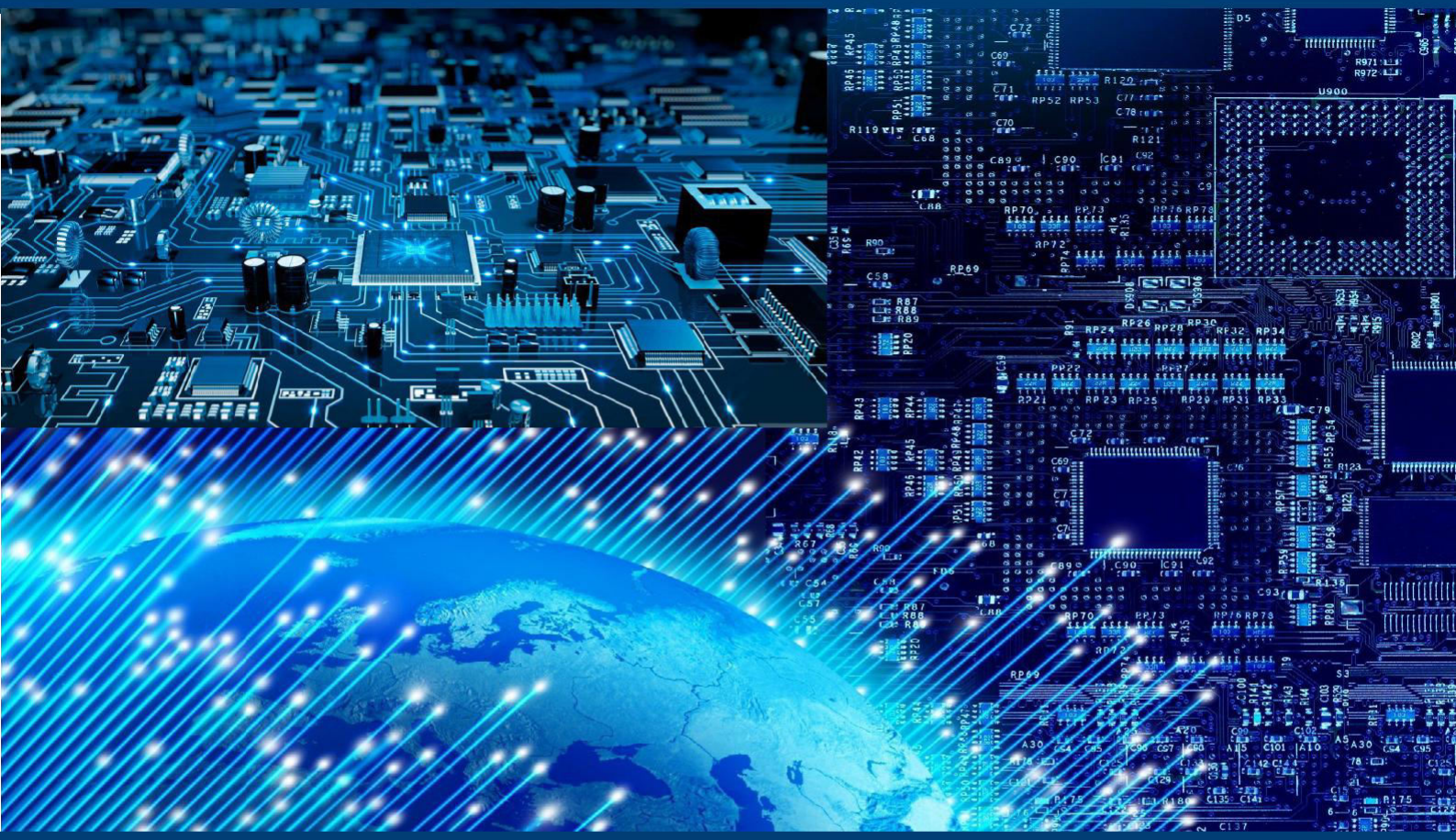


IV.CONCLUSION AND FUTURE WORK

In this paper, we have proposed a novel approach to outfit recommendation by integrating machine learning techniques and data analytics to enhance user experience and satisfaction. The system leverages user profiling, contextual analysis, collaborative filtering, and visual style compatibility to generate personalized outfit suggestions. By addressing challenges such as recommendation accuracy and context awareness, the proposed system significantly improves the relevance and aesthetic appeal of outfit combinations. Our future work will focus on further enhancing the recommendation algorithm by incorporating real-time fashion trends and user feedback. We also plan to implement advanced deep learning models to analyze fashion images and improve outfit compatibility predictions. Additionally, the system will be expanded to support multilingual interfaces and integrate with social media platforms to gather real-world fashion preferences and trends.

REFERENCES

1. Bobadilla, J., Ortega, F., Hernando, A., & Gutiérrez, A. (2013). Recommender systems survey. *Knowledge-Based Systems*, 46, 109-132. https://doi.org/10.1016/j.knosys.2013.03.012
2. Gómez-Uribe, C. A., & Hunt, N. (2015). The Netflix recommender system: Algorithms, business value, and innovation. *ACM Transactions on Management Information Systems (TMIS)*, 6(4), 1-19. https://doi.org/10.1145/2843948
3. He, X., Liao, L., Zhang, H., Nie, L., Hu, X., & Chua, T. S. (2017). Neural collaborative filtering. *Proceedings of the 26th International Conference on World Wide Web (WWW '17)*, 173-182. https://doi.org/10.1145/3038912.3052569
4. Huang, Y., Zhang, Z., & Jin, L. (2018). Fashion recommendation system: A review. *International Journal of Computer Applications*, 181(5), 1-7. https://doi.org/10.5120/ijca2018916814
5. **Fashion Recommendation System Using Machine Learning**
Lingala Sivaranjani, Sandeep Kumar Rachamadugu, B.V. Suresh Reddy



IJARASEM

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| Mobile No: +91-9940572462 | Whatsapp: +91-9940572462 | ijarasem@gmail.com |

www.ijarasem.com