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ARStyle: AI Fashion Advisor with AR Try-on and E-Commerce Integration

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Abstract: *Online shopping platforms encounter difficulties with matches between customer preferences and recommended clothes and virtual dressing functions which results in failed selections plus elevated product returns. ARStyle resolves these problems through the combination of AI capabilities with AR technology. A system gathers user information including gender along with dimensions and body shape which it uses to create recommendations using artificial intelligence filters. Users experience virtual try-on through image-based overlay as well as real-time AR visualization. The integration between e-commerce platforms and ARStyle offers users better online shopping by boosting confidence and cutting down return rates.*

Keywords: Fashion Advisor, Augmented Reality, Virtual Try-On, Online Shopping, clothing recommendations, Virtual Fitting

I. INTRODUCTION

The fashion e-commerce sector has two main difficulties in offering customized shopping tastes and precise sizing recommendations. Static images along with standard size charts do not understand bodily variations and personal preferences so this leads shoppers to constantly return their purchases. ARStyle closes the gap by linking AI recommendation systems with AR try-on technology to help users feel more certain about their choices during purchases.

II. PROBLEM STATEMENT AND OBJECTIVES

Problem Statement

The online fashion retail industry encounters fundamental difficulties when offering suitable personalized shopping solutions to its customers. Static images and general size charts found on conventional e-commerce platforms result in many misfit purchases and high return rates among users. The shopping experience in online platforms leads to this problem each time customers need to decide their purchases due to differing size patterns and bodily measurements and diverse personal style choices.

To deals with that the problem Arstyle, AI-powered fashion recommendation system works together with AR virtual try-ons to show them real-time outfit visualizations. Through its machine learning abilities and image processing capabilities the system delivers individualized style recommendations alongside simplified virtual fitting along with better user confidence and less returns.

Objectives

- To use an AI-powered recommendation engine to offer tailored apparel suggestions based on user characteristics such as gender, height, body shape, and skin tone.
- To use AR technology and image-based try-on capabilities to let people virtually try on clothing in real time, ensuring a better fit and appearance preview.
- To improve the shopping experience across multiple merchants by integrating seamlessly with third-party e-commerce platforms via an API, enabling virtual try-on functionality on platforms like Amazon.

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- To increase customer satisfaction and lower return rates by providing precise suggestions and visualization tools that enhance the dependability, appeal, and personalization of online buying.

III. LITERATURE REVIEW

Table 1: Literature Survey Table

Sr. No	Title	Methodology	Disadvantages
[1]	"AI-Driven Personalized Fashion Stylist",OmUdavant, Rishvi Kumari, Rocky Kumar, Mayuri Chikane,(Nov-2023)	Uses machine learning models, including collaborative filtering, to create personalized fashion recommendations based on user preferences.	Virtual recommendations might not always align with real-world physical try-ons, leading to potential mismatches.
[2]	IP-Adapter : Text Compatible Image Prompt Adapter for Text-to-Image Diffusion Models, (Aug-2023)	IP-Adapter decouples text and image processing with cross-attention, freezing the diffusion model and training only 22M parameters while leveraging a CLIP image encoder for multimodal generation.	Limited fine-grained details, less precise than Textual Inversion, Lowerfidelity to referenceimages
[3]	"Virtual Try-ONClothes",Prof. Pooja Parikh, Reshma Kale, Vaishnavi Bidarkar, Vaishnavi Sarode, Soni Singh,(May-2023)	Machine learning techniques using Haar Cascade Classifier and OpenCV library for image processing and outfit recommendation in a virtual try-on system.	Limited by accurate sizing of the body and realism of try-on demonstrations, making user satisfaction harder to achieve.
[4]	"Developing an AI-based Automated Fashion Design System: Reflecting the Work Process of Fashion Designers",Woojin Choi, Seyoon Jang, Ha Youn Kim, Yuri Lee, Sang-goo Lee, Hanbit Lee, Sungchan Park, (2023)	Utilizes Generative Adversarial Networks (GANs) to create a fashion design system reflecting the processes of human fashion designers.	Limited to specific types of garments, such as dresses and skirts, which reduces versatility.
[5]	"Interactive Virtual Try-On Clothing Design Systems",Yuwei Meng, P.Y. Mok, Xiaogang Jin',(Dec-2022)	Physical-based real-time cloth simulation using ellipsoid bounding for human models, dynamic cloth model for high-quality virtual try-on simulation.	Requires high computational resources, and collision detection between cloth and body is challenging for complex and tight-fitting clothes.
[6]	"A Systematic Literature Review and Analysis of Try-On Technology: Virtual Fitting Rooms",Raheela Batool, Jian Mou, (Dec-2023)	A systematic review of 80 studies (2005–2023) on virtual fitting room technologies, analyzing consumer, technological, and cultural aspects. Research is categorized by theories, outcomes, and mediating factors through an extensive database search.	Limited focus on the most recent technological developments after February 2023. The variability in results across studies makes it difficult to reach definitive conclusions on the best approaches for implementing try-on technology.

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[7]	"Study of AI-Driven Fashion Recommender Systems",ShaghayeghShirkhani, Hamam Mokayed, Rajkumar Saini, Hum Yan Chai, (2023)	A comprehensive review of AI-driven fashion recommender systems, emphasizing deep learning, content-based image retrieval, and compatibility estimation.	Complex relationships and the high dimensionality of attributes pose challenges for fully understanding and modeling the fashion domain.
[8]	"Smart Fashion: A Review of AI Applications in Virtual Try-On & Fashion Synthesis", Seyed Omid Mohammadi, Ahmad Kalhor, (Nov-2021)	Categorizes 110 articles related to fashion AI into two main areas: virtual try-on and fashion synthesis. Uses a three-level hierarchy and multi-label scheme for categorization, focusing on AI, computer vision, and deep learning methodologies for fashion applications.	The survey primarily focuses on studies between 2017-2021, possibly missing newer trends or cutting-edge developments in AI applications in fashion.

As shown in Table1, the studies reveal limitations such as misalignment between virtual try-ons and physical fittings, insufficient fine-grained detail and realism, high computational resource demands, and restricted garment versatility.

IV. METHODOLOGY

As shown in figure 1,The ARStyle platform follows a structured approach:

User Interaction and Data Collection:

- Users register and input personal details on the ARStyle website.
- They choose to try on clothing by either uploading an image or capturing one via a live camera feed.

Image Processing Pipeline:

- Segmentation: The uploaded image is processed using a pre-trained segmentation model to isolate the user's body.
- Diffusion Inpainting: The segmented body mask, along with a selected clothing image, is passed into the Stable Diffusion XL Inpainting pipeline. The IP Adapter integrates the clothing image as an image prompt using decoupled cross-attention. A tailored text prompt (and negative prompt) guides the inpainting process to generate a photorealistic virtual try-on output.

API Integration and Output Delivery:

- The backend, deployed on Google Colab, is exposed via a Gradio API.
- The website sends image data to this API, and the backend processes it to generate the try-on result.
- The processed image is returned to the website and displayed in the respective try-on section (image-based try-on or the design-only AR try-on page).

IV. SYSTEM DESIGN

The architecture of ARStyle includes:

Frontend (React.js)

- Home page displaying trending collections.
- Sections for men's and women's fashion.
- Virtual try-on feature with image upload and live camera options.

Backend (Flask, Gradio API)

- AI recommendation system.
- Image segmentation and inpainting pipeline.

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Virtual Try-On

- Image-based try-on using AI-powered segmentation.

E-Commerce Integration

- API connections to third-party marketplaces

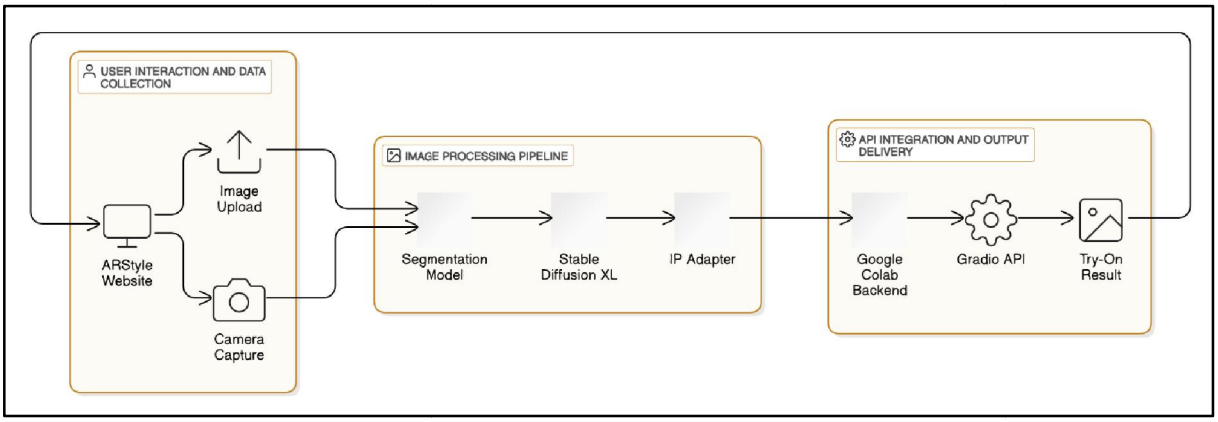

Fig. 1.Block Diagram

V. RESULTS AND ANALYSIS

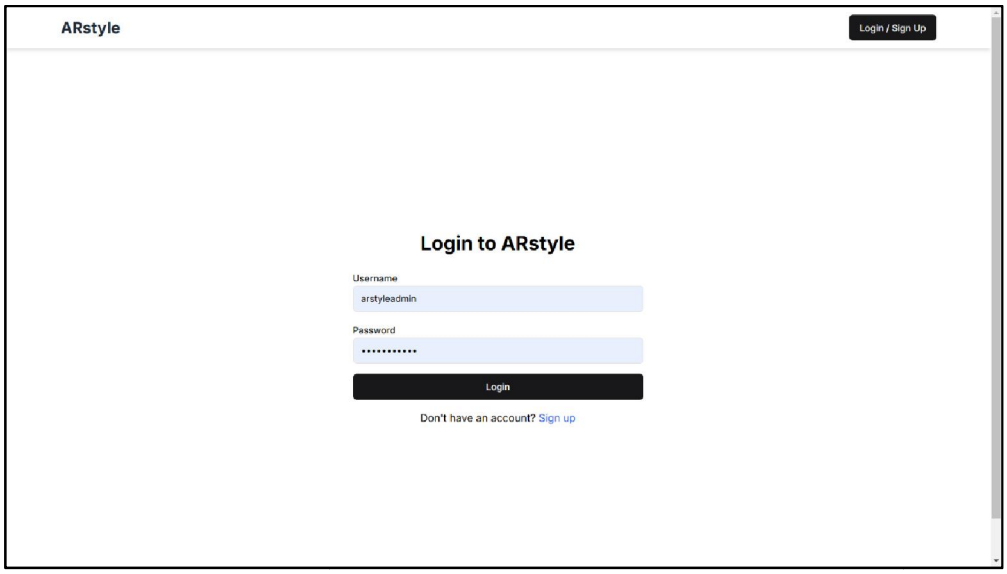

Fig.2. Login Page

As shown in fig 2, The ARStyle platform allows users to log in and access AI-driven fashion recommendations with AR try-on. Customers can virtually try on clothes in real-time, enhancing purchase confidence and reducing return rates.

As shown in fig 3, When users click on the Men's Collection, all available men's clothing items are displayed. They can select any outfit to try on virtually using the AR feature, allowing them to see how it fits and looks in real time, improving their shopping experience

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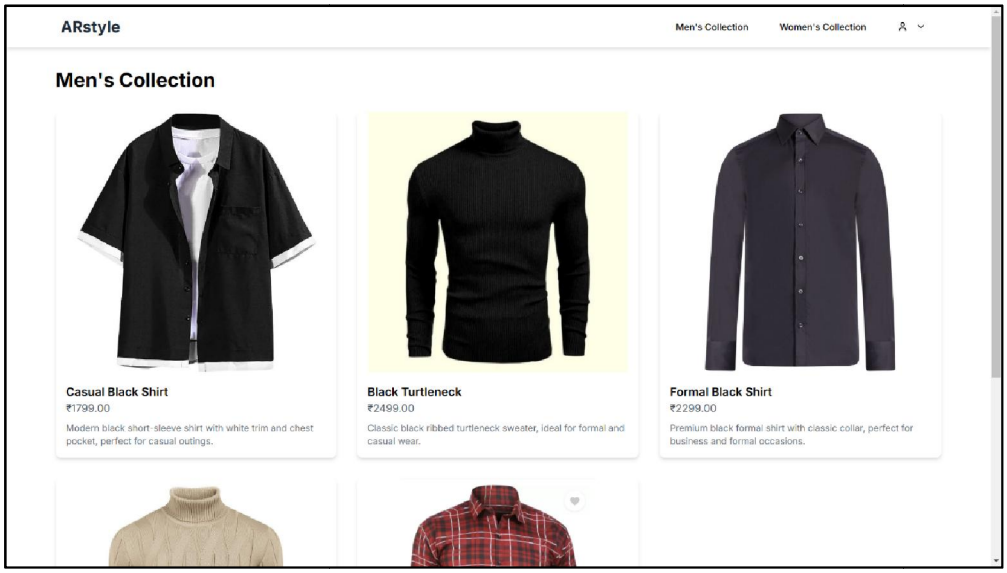

Fig.3. Men's Collection

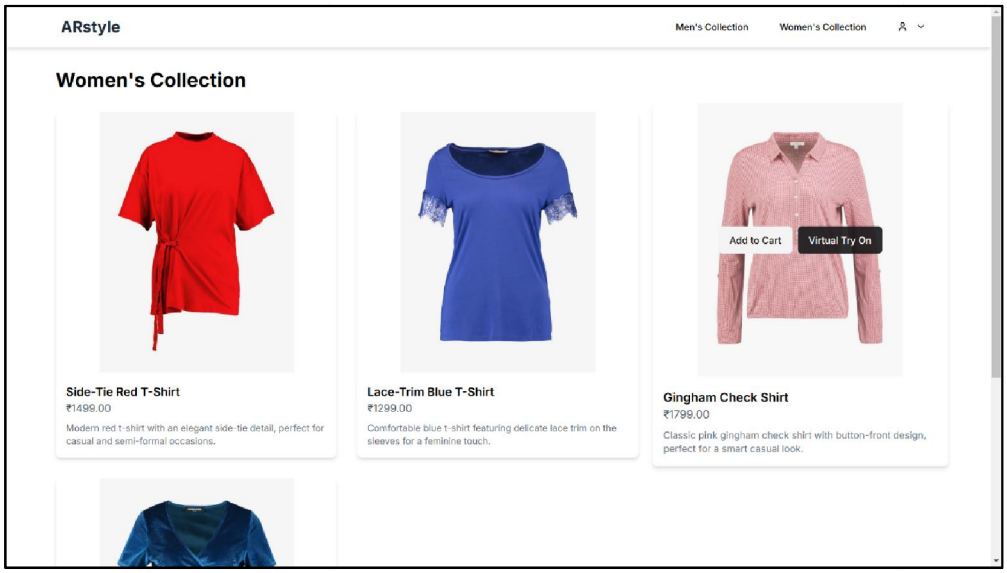

Fig.4. Women's Collection

As shown in fig 4, When users hover over a clothing item, options to Add to Cart and Virtually Try On appear. If they like the product, they can add it to their cart for purchase, or they can use the AR try-on feature to see how it looks before making a decision. The same functionality is available in the Women's Collection.

As shown in fig 5, When users click on Virtually Try On, they are prompted to either upload their photo or capture a live picture online to try on the selected product. This feature enhances the shopping experience by providing a realistic visualization of how the outfit will look before making a purchase

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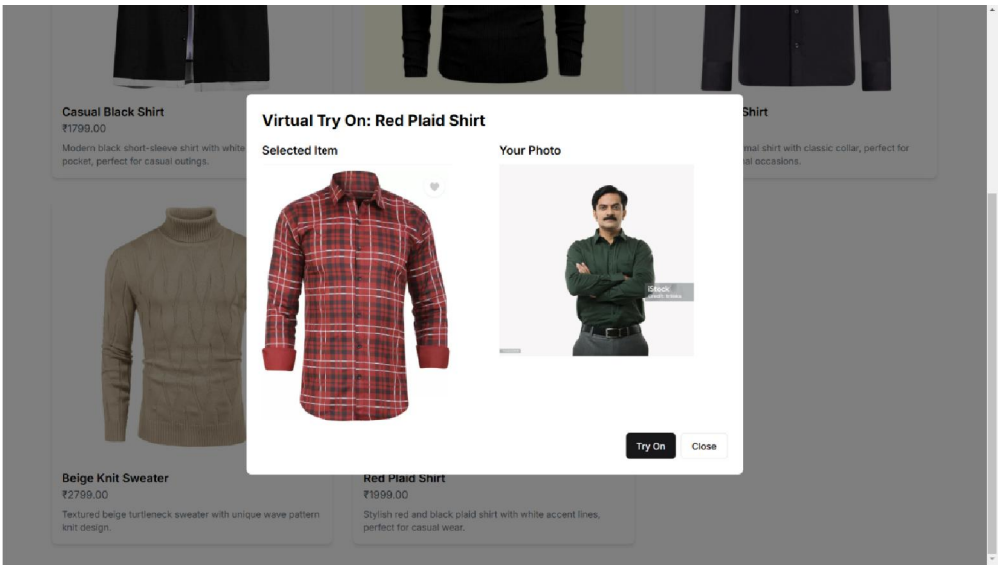

Fig. 5. Upload Human Photo

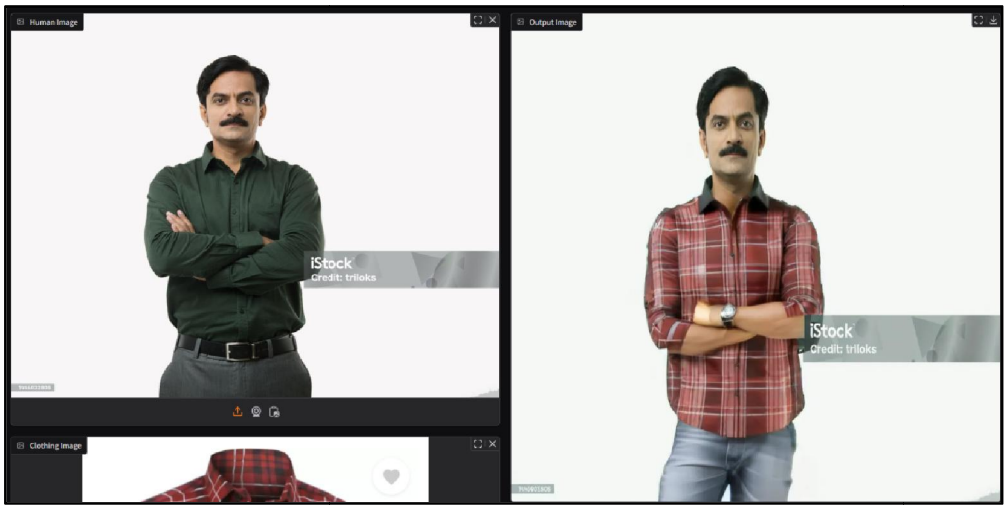

Fig.6. Output

VI. CONCLUSION AND FUTURE SCOPE

ARStyle significantly enhances online fashion retail by leveraging advanced AI, AR-powered virtual try-on systems, and seamless e-commerce integration. By providing AI-driven recommendations and virtual model testers, it addresses challenges such as fit issues, high return rates, and limited personalization, ultimately increasing customer trust and satisfaction while bridging the gap between physical and digital shopping experiences.

Looking ahead, ARStyle aims to revolutionize the digital fashion landscape by incorporating 3D body scanning for improved virtual fitting accuracy and real-time, physics-based fabric simulation combined with deep learning for enhanced customization. Future developments will focus on launching a dedicated mobile platform, expanding e-commerce integrations, optimizing performance via edge computing, and exploring AI-driven sustainable design and Metaverse frameworks to elevate the overall user experience

REFERENCES

[1] O. Udavant, R. Kumari, R. Kumar, and M. Chikane, "AI-driven personalized fashion stylist," International Research Journal of Modern Engineering and Technology (IRJMET), vol. 4, issue 6, pp. 35-42, Nov. 2023.

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[2] H. Ye, J. Zhang, S. Liu, X. Han, and W. Yang, "IP-Adapter: Text Compatible Image Prompt Adapter for Text-to-Image Diffusion Models," Tencent AI Lab, arXiv preprint arXiv:2308.06721, Aug. 2023.
[3] P. Parikh, R. Kale, V. Bidarkar, V. Sarode, and S. Singh, "Virtual Try-ON Clothes," International Journal for Research in Applied Science & Engineering Technology (IJRASET), vol. 11, issue 5, pp. 7406-7411, May 2023. DOI: 10.22214/ijraset.2023.53115.
[4] W. Choi, S. Jang, H. Y. Kim, Y. Lee, S.-g. Lee, H. Lee, and S. Park, "Developing an AI-based automated fashion design system: Reflecting the work process of fashion designers," SN Applied Sciences, vol. 4, no. 514, pp. 1-10, Jan. 2023. DOI: 10.1007/s42979-023-01932-9.
[5] Y. Meng, P.Y. Mok, and X. Jin, "Interactive Virtual Try-On Clothing Design Systems," Computer-Aided Design, vol. 42, issue 3, pp. 310-321, Dec. 2009. DOI: 10.1016/j.cad.2009.12.004.
[6] S. Bahir, S. Shedage, S. Talekar, and P. Mokashe, "Image-Based Virtual Try on Clothes," International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), vol. 2, issue 1, pp. 132-135, Nov. 2022. DOI: 10.48175/568.
[7] R. Batool and J. Mou, "A Systematic Literature Review and Analysis of Try-On Technology: Virtual Fitting Rooms," Data and Information Management, vol. 8, issue 100060, pp. 1-17, Dec. 2023. DOI: https://doi.org/10.1016/j.dim.2023.100060 .
[8] S. Shirkhani, H. Mokayed, R. Saini, and H. Y. Chai, "Study of AI-Driven Fashion Recommender Systems," IEEE Access, vol. 11, pp. 246-260, 2023.