International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 12 Issue: 05 | May 2025 www.irjet.net p-ISSN: 2395-0072

"AI Think and Future Fashion"

Varsharani Shelke[1], Akanksha Awale[2], Disha Khose[3] , Prof. V M Mhalgi[4]

[1,2,3]U.G Student, [4]Assistant Professor
Department of Computer Science and engineering
Shree Tuljabhavani College Of Engineering Tuljapur.

Abstract - *Virtual try-on systems have become transformative tools in the fashion and beauty industries, allowing users to digitally experience clothing, cosmetics, and accessories before making a purchase. This paper introduces Tryzura, a comprehensive and intelligent virtual try-on framework that leverages advanced machine learning and computer vision technologies to deliver highly realistic and personalized simulations. The system incorporates deep learning techniques for body segmentation, pose estimation, and facial recognition, ensuring precise alignment of garments, accurate makeup rendering, and seamless accessory placement. By overcoming technical challenges such as texture fidelity, color consistency, and user-specific customization, Tryzura creates a smooth and immersive try-on experience. Experimental results on diverse datasets confirm the effectiveness of the proposed framework in generating lifelike outputs across a wide range of fashion and beauty products. This work underscores the potential of Tryzura to enhance customer engagement, reduce product returns, and redefine the future of online shopping.*

1.INTRODUCTION

Virtual try-on systems are revolutionizing the fashion and beauty industries by enabling users to digitally preview clothing, makeup, and accessories, fostering a more interactive and personalized shopping experience. This project presents Try-zura, a next-generation virtual try-on solution that integrates cutting-edge advancements in computer vision, deep learning, and augmented reality to generate lifelike visualizations of fashion and beauty products. Through sophisticated techniques such as pose estimation, facial mapping, and 3D rendering, Try-zura delivers highly accurate and realistic simulations, allowing users to explore diverse styles and make confident, informed purchase decisions. By tackling critical challenges like fit uncertainty, high return rates, and limited customer engagement, Try-zura significantly elevates the online shopping experience. In addition, it provides substantial value to e-commerce and retail platforms by boosting customer satisfaction and reducing operational overhead. Designed with performance, privacy, and scalability in mind, Tryzura stands as a reliable and future-ready solution for the evolving digital commerce landscape.

1.1 Clothing

The clothing engine within Try-zura transforms digital shopping into an interactive, lifelike experience by utilizing real-time camera input. Whether through a snapshot or continuous video, the system reconstructs the user's form using advanced pose detection and three-dimensional body modelling . This precise mapping ensures garments contour naturally to various body types, accounting for shape, posture, and motion. Enhanced by dynamic fabric simulation, Try-zura reproduces the authentic flow, weight, and feel of different materials, giving users a realistic preview that extends beyond static images.

Users can actively engage with their virtual mirror—rotating views, zooming in on fit details, and examining how garments respond to movement. By analyzing the user's unique body metrics from the camera stream, Tryzura also provides intelligent size guidance, tailored to individual proportions. This not only boosts user confidence but also reduces the likelihood of size-related returns.

Beyond the user experience, the module offers tangible benefits to retailers. With integrated analytics, Tryzura captures style preferences and behavior patterns, enabling smarter inventory decisions and hyper-personalized recommendations. Ultimately, this module acts as a digital bridge between screen and store, making fashion discovery smoother, smarter, and more enjoyable for all.

1.2 Make-up & Accessories

The makeup and accessory components of Tryzura elevate the virtual styling experience by offering a strikingly realistic and responsive digital transformation. The makeup feature harnesses real-time facial mapping technology to apply virtual cosmetics—ranging from lip color to eyeshadow and blush—with lifelike precision. It intelligently adapts to each user's facial contours and skin tone, allowing for natural-looking results. Users can freely test different color palettes, textures, and finishes, gaining confidence in their appearance before committing to a product. To ensure visual consistency, the module simulates multiple lighting environments, letting users preview how each makeup style holds up under various settings, from soft indoor light to bright outdoor sun.

Meanwhile, the accessories module brings items like earrings, glasses, and watches to life through detailed 3D rendering and AR integration. Smart detection aligns each item with the user's face or body, adjusting scale and orientation for a realistic fit. The interface encourages hands-on exploration—users can rotate the view, zoom in on fine details, and see how each piece complements their style from different angles.

Together, these modules turn digital browsing into a fully immersive styling session. By combining live camera input with intelligent customization, Try-zura closes the gap between online and in-store experiences. For retailers, this means fewer returns, deeper customer insights, and stronger engagement. For users, it's a more confident, creative, and enjoyable way to shop.

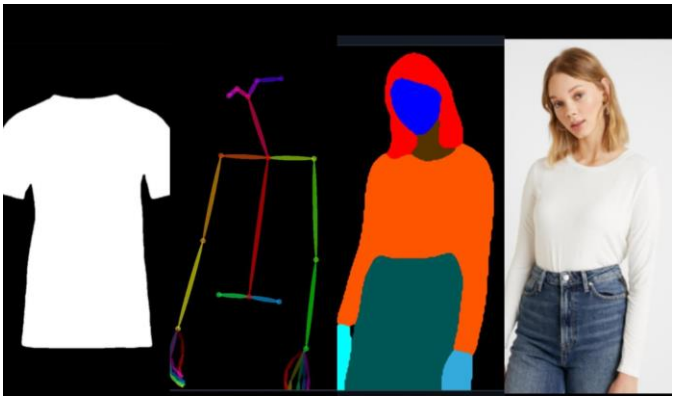


Chart -1: Pose Detection Using AR

This illustration showcases the fundamental elements of the virtual try-on system tailored for clothing, augmented by cutting-edge AR technology. On the left side, a detailed 3D representation of a garment—a crisp white T-shirt—is shown, which is then digitally draped over the user's virtual avatar positioned in the center. The avatar's posture and movements are continuously refined using pose estimation, visualized by a color-coded skeletal structure, ensuring the clothing adapts precisely to the user's unique body shape and stance.

On the right, the system merges virtual and real worlds by displaying the user wearing the digital garment within their actual surroundings, enabled by augmented reality. This real-time blending creates a natural, fluid look and feel as the clothing responds to the user's motions. By delivering a customized virtual fitting experience, the platform empowers shoppers to confidently explore styles, enhancing user interaction while minimizing hesitation and uncertainty when buying fashion items online.

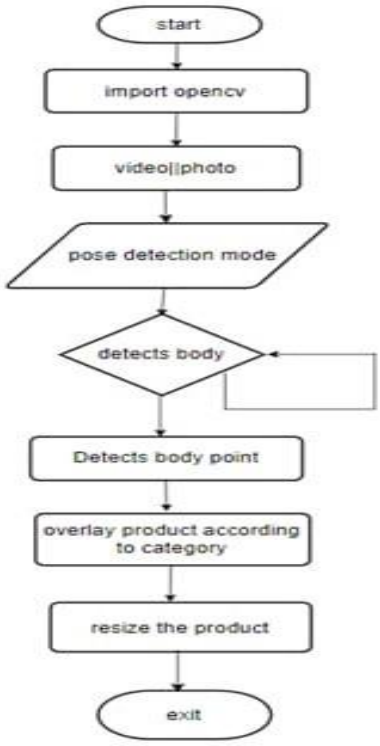
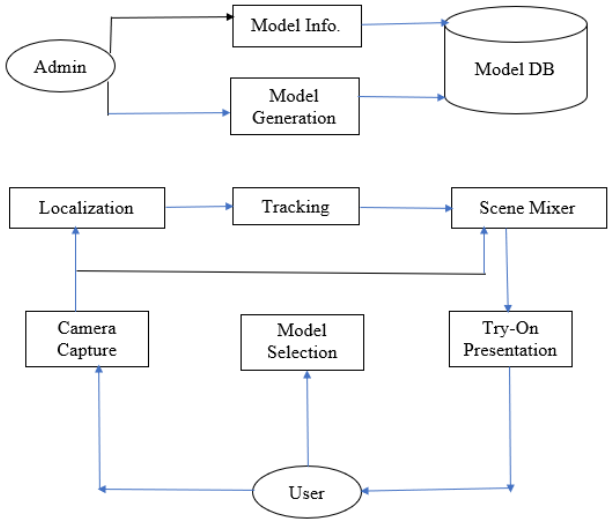


Fig 2. flowchart of working of model



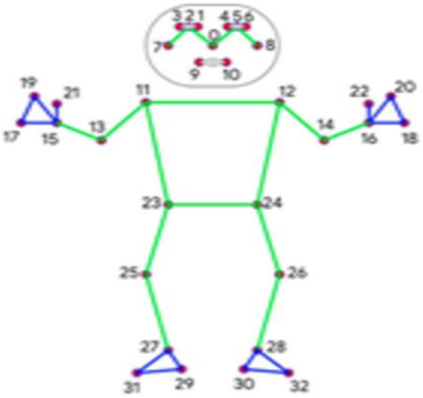
Dia.1 SYSTEM ARCHITECTURE: Systematic Representation

The diagram below illustrates the overall architecture of our model, highlighting key processes such as localization, camera input, and virtual try-on display. This flowchart provides a clear overview to help understand the system's workflow and functionality.

Our proposed solution integrates seamlessly with an e-commerce platform, allowing users to select and add their preferred clothing items to a shopping cart. Before finalizing any purchase, customers can virtually try on the garments

using the system, enabling them to see how each piece fits and looks in real time—helping them make better-informed buying decisions.

A. Open CV



B.

Fig 5.Blaze Pose

OpenCV is an open-source software toolkit designed for computer vision and machine learning tasks. It was developed to establish a unified foundation for building vision-based applications and to simplify the incorporation of visual intelligence into everyday devices. Thanks to its Apache 2.0 license, OpenCV offers businesses the flexibility to freely use, adapt, and distribute the code according to their needs.

B. Pose module & Hand module

Pose estimation is a technique in computer vision that analyzes images to predict the position and orientation of a person's body. This technology plays a vital role across various fields due to its wide range of applications. Human pose estimation works by detecting and mapping key points on the body, enabling accurate interpretation of a person's posture from a single image. The process can be performed in either two-dimensional or three-dimensional space. Generally, the method involves two main stages to achieve precise results.

3.How Virtual Try-On Systems Work:

Augmented Reality (AR):
AR technology projects digital versions of products onto live views captured through devices like smartphones or webcams, letting users visualize how items would appear and fit within their actual surroundings.

Computer Vision:
Through advanced image processing, computer vision interprets the user's body shape, facial features, and movements from photos or videos, enabling precise placement and adjustment of virtual items.

Machine Learning:
Machine learning algorithms are developed to simulate how garments or accessories behave on different body types, improving the authenticity and accuracy of the virtual try-on experience.

Real-timevs.Static:
Virtual try-on systems can operate in real time—overlaying products onto a live video stream—or provide static previews where users upload images or videos to see how products might look.

4. Benefits of Virtual Try-On Systems:

Enhanced Shopping Experience:

Virtual try-on makes online shopping more interactive and engaging, allowing customers to visualize products before purchasing.

Reduced Uncertainty:

By providing a realistic preview of fit and appearance, virtual try-on helps customers make more informed decisions and reduces the risk of returns.

Increased Customer Confidence:

Customers feel more confident in their purchases when they can see how items will look and fit on them beforehand.

Reduced Returns:

By minimizing the guesswork, virtual try-on can significantly reduce returns caused by fit issues.

Cost Savings:

Reduced returns translate to lower costs for retailers, including shipping, processing, and restocking.

Project Summary:

In this work, we have designed and built a virtual try-on platform using Python, combining computer vision with AI-based simulation techniques to enable users to see clothing items on themselves in real time. The system integrates modules for apparel, makeup, and accessories, utilizing camera inputs and augmented reality to deliver a rich, interactive shopping experience. By allowing users to explore products virtually without needing physical samples, this solution boosts engagement, streamlines decision-making, and reduces uncertainty in online purchases. This technology not only elevates customer satisfaction but also supports e-commerce platforms in lowering return rates and offering more tailored recommendations through AI.

Conclusion:

Despite these achievements, several challenges remain. Accurately fitting garments across a wide range of body types, and adjusting for variables like lighting and camera quality, continue to demand attention. Future developments should aim to improve fit precision, increase real-time performance, and ensure compatibility across diverse devices and operating systems. Expanding the system with AI-driven style advice and virtual closet management could further enrich user interaction. While obstacles exist, ongoing advances in AR and AI are rapidly expanding the possibilities of virtual try-on technologies, positioning them as vital components in the future of online retail. As these digital fashion tools mature, they promise to transform shopping habits by offering more convenience, customization, and sustainability within the fashion and beauty sectors.

REFERENCES

1. Minar MR, Tuan TT, Ahn H. Proposed Cp-vton+, a virtual try-on method that maintains the shape and texture of clothing in image-based applications. Presented at the Conference on Computer Vision and Pattern Recognition Workshops, 2020, pages 10-14.

2. Wang B, Zheng H, Liang X. Developed a network focused on preserving distinctive features in image-based virtual try-on systems. Published in the Proceedings of the European Conference on Computer Vision, 2018, pages 589-604.

3. Chen CM. Explored the evaluation of fit in the made-to-measure clothing process. International Journal of Clothing Science and Technology, 2007, Volume 19, Issue 2, pages 131-144.

4. Marelli D, Bianco S, Ciocca G. Created a web-based platform enabling virtual try-on of eyeglasses within a 3D space. Presented at the 2019 IEEE 23rd International Symposium on Consumer Technologies, University of Milano-Bicocca, Milan, Italy.

5. Sun F, Guo J, Su Z, Gao C. Introduced an image-based virtual try-on network emphasizing structural consistency. Published by IEEE in 2019, affiliated with Sun Yat-sen University, Guangzhou, China.

6. Marelli D, Bianco S, Ciocca G. Developed a 3D virtual try-on web application for glasses, presented at the 2019 IEEE 23rd International Symposium on Consumer Technologies, University of Milano-Bicocca, Milan, Italy.