Using Deep Learning Virtual Try-On System

Mrudagandha Babalsure*1, Pooja Hyalij*2, Akanksha Kapase *3, Snehal Deokate *

Guidance Of: Dr. P. D. Halle

Undergrad. Student, Dept. of Information Technologies SKN Sinhgad Institute of Technology & Science,Lonavala, Maharashtra

1.ABSTRACT

The retail assiduity is witnessing a transformative shift as online shopping becomes decreasingly current, but one patient challenge remains the incapability for guests to physically try on products before making a purchase. This limitation frequently leads to advanced return rates, impacting both client satisfaction and functional effectiveness. still, the confluence of deep literacy and virtual reality technologies has given rise to the Deep literacy Virtual Try- On System, offering a promising result. This system leverages advanced deep literacy algorithms and computer vision ways to produce immersive virtual befitting apartments, allowing guests to fantasize themselves in colourful products in real-time.

2.INTRODUCTION

In recent years, the retail industry has witnessed a transformative shift, spurred by technological advancements and evolving consumer preferences. As online shopping continues to gain momentum, the inability for customers to physically try on products has emerged as a central challenge for retailers. This limitation frequently leads to higher return rates and dissatisfied customers, impacting both profitability and customer trust. However, a promising solution has emerged at the intersection of deep learning and virtual reality technology - the Deep Learning Virtual Try-On System.

The Powe of Deep Learning:

Deep Learning, a subfield of artificial intelligence, has been at the forefront of numerous groundbreaking innovations, and the retail sector is no exception. Deep Learning's advanced algorithms, particularly within the realm of computer vision, are revolutionizing the way consumers interact with products. These systems employ sophisticated techniques like facial recognition, body tracking, and neural networks to create immersive, interactive, and personalized virtual fitting rooms.

3.BACKGROUND

The retail industry has long relied on the physical shopping experience, where customers can see, touch, and try on products before making a purchase. However, the digital age has revolutionized consumer behaviour, with an increasing number of
shoppers turning to online platforms for convenience and a broader range of options. While online shopping offers numerous advantages, it presents a fundamental challenge: the absence of a physical try-on experience.

This challenge has led to a significant disparity between the online and offline retail experiences. Customers shopping online often face uncertainty about the fit, style, and overall suitability of products, particularly in the case of clothing, footwear, accessories, and cosmetics.

4.OBJECTIVE

1.Enhance Customer Confidence and Engagement:

To increase customer confidence by offering a highly realistic and interactive virtual try-on experience, encouraging more informed and satisfying purchasing decisions. To engage customers by providing a dynamic and personalized shopping experience that promotes user interaction with the virtual try-on system.

2. Minimize Return Rates:

To reduce the rate of product returns, particularly in the fashion and apparel industry, by enabling customers to accurately assess how products will fit and look on them before making a purchase. To save costs associated with return processing and logistics, as well as reduce the environmental impact of unnecessary returns.

3. Improve Personalization:

To utilize deep learning algorithms to analyse customer data, such as body measurements, style preferences, and purchase history, in order to provide tailored product recommendations and personalized shopping experiences. To enhance the customer's sense of being understood and valued by the online retailer.

4. Optimize Inventory Management:

To enable retailers to gather data on customer preferences and trends, helping them better manage inventory by stocking products that are more likely to be purchased. To reduce the need for excess inventory and costly markdowns, resulting in improved inventory turnover and profitability.

5. Differentiate the Brand and Gain Competitive Advantage:

5.METHODOLOGY

1. Data Collection:

Gather a diverse dataset of product images and their corresponding attributes, including clothing items, accessories, or cosmetics. Collect images of models or human figures from various angles and in different poses for the virtual try-on process.

2. Data Preprocessing: Annotate and label the dataset with information about product attributes, sizes, and styles. Augment the dataset by adding variations in lighting, background, and other factors to make it more robust.

3. Deep Learning Model Selection: Choose appropriate deep learning architectures for various tasks within the system. For example: Use Convolutional Neural Networks (CNNs) for product image analysis and feature extraction.

4. Model Training: Train the selected models using the annotated dataset. Fine-tune the models to learn the product features, styles, and attributes.

5. Development of the Virtual Try-On Platform: Create a user-friendly interface for customers to interact with the virtual try-on system.

6.LITERATURE SURVEY

A literature survey on the use of Deep Learning Virtual Try-On Systems reveals a growing body of research and practical implementations in the field. These systems have gained significant attention due to their potential to revolutionize the retail industry by providing customers with an immersive and personalized online shopping experience. Below, I provide an overview of key studies and research papers in this domain:

1. "Fashion++: Minimal Edits for Outfit Improvement"-This paper presents a deep learning-based approach for suggesting minimal edits to outfits in images, which can be integrated into virtual try-on systems to improve the look and style of clothing on users.
2. "Learning Pose-Aware Models for Pose-Invariant Face Recognition in the Wild" Although primarily focused on face recognition, this paper introduces pose-aware models that can be valuable for virtual try-on systems by understanding and accommodating variations in human poses.
3. "Learning to Transfer: Unsupervised Meta-Domain Adaptation for Zero-Shot Learning"-This study explores unsupervised meta-domain adaptation, which can be leveraged for domain-specific adaptations in virtual try-on systems, enhancing their accuracy in diverse scenarios.
4. "Fashion Recommendation with Explicit and Implicit Feedbacks"-This paper addresses the recommendation aspect of virtual try-on systems, utilizing deep learning techniques to provide personalized clothing recommendations to users.

1. "Virtual Try-On Network: Toward Photo-Realistic Virtual Try-On for Arbitrary Products"-This research introduces the "Virtual Try-On Network," which aims to achieve photorealistic virtual try-on for various products and garments, emphasizing the importance of realism in the virtual try-on process.

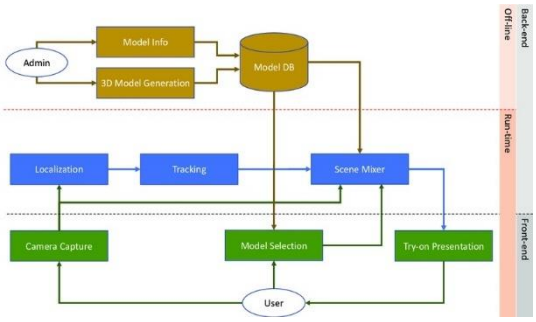
7.PROPOSED STATEMENT

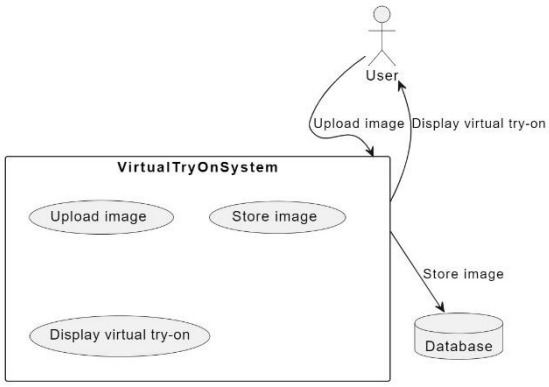
"In an era marked by the digital transformation of the retail industry, the integration of Deep Learning Virtual Try-On Systems emerges as a pioneering solution to address the persistent challenge of the online shopping experience. This proposal seeks to harness the power of deep learning, computer vision, and personalized recommendations to create an immersive and highly realistic virtual try-on environment, empowering customers to confidently visualize themselves in a wide range of products. By seamlessly bridging the gap between the physical and digital realms, we aim to enhance customer engagement, reduce return rates, and elevate the overall online shopping experience, ultimately revolutionizing the way consumers and retailers interact in the modern retail landscape."

5. Computer Vision Integration: Define the computer vision techniques for facial feature recognition, body shape analysis, and clothing size estimation. Specify the level of real-time tracking and accuracy required.

These specifications provide a clear roadmap for designing and developing a Deep Learning Virtual Try-On System that meets the objectives and requirements of the project, ensuring a seamless and engaging virtual try-on experience for users.

9.SYSTEM ARCHITECTURE





8.REQUIREMENT SPECIFICATIONS

To effectively design and develop a Deep Learning Virtual Try-On System, you need to establish a set of technical specifications that outline the system's requirements, features, and capabilities. These specifications will guide the development process and ensure that the system meets its objectives. Here's a list of required specifications for a Deep Learning Virtual Try-On System:

1. User Interface (UI): Design an intuitive and user-friendly interface for customers to interact with the system. Include features for image upload, real-time video streaming, and product selection. Ensure compatibility with various devices and web browsers.

2. Deep Learning Models: Specify the deep learning architectures to be used, such as CNNs for image analysis, GANs for image generation, and RNNs or
Transformers for natural language processing. Define the model requirements, including model size, accuracy, and inference speed.

3. Data Handling: Describe the data sources and formats for product images, customer data, and product attributes. Specify data preprocessing steps, including data augmentation and cleaning.

4. Personalization: Outline the algorithms and methods for analyzing customer data to provide personalized product recommendations. Specify the level of personalization, considering factors like style, body measurements, and customer history.

9.ADVANTAGES

1. Enhanced Customer Confidence: Deep learning virtual try-on systems provide customers with a highly realistic and interactive way to visualize themselves wearing products.

2. Reduced Return Rates: One of the most significant advantages is the potential to minimize product returns. Customers can see how products fit and look on them before making a purchase, leading to a reduction in return rates, which is costly for retailers and contributes to environmental waste.

3. Personalized Shopping Experience: Deep learning algorithms analyse customer data, such as body measurements and style preferences, to provide personalized product recommendations. This level of personalization enhances the overall shopping experience, making it more relevant to individual customers.

4. Improved Inventory Management: Retailers can gather valuable data on customer preferences and product performance, helping them optimize inventory management. By stocking products more likely to be purchased, retailers can reduce excess inventory and markdowns, resulting in improved profitability.

5. Competitive Advantage: Implementing a deep learning virtual try-on system can give retailers a competitive edge in the market. It demonstrates a commitment to innovation, attracting tech-savvy customers and positioning the brand as a leader in online retail.

10.APPLICATION AND FUTURE ENHANCEMENT

Applications:

1.Fashion and Apparel Retail: Online Clothing Try-On: Customers can virtually try on clothing, shoes, and accessories to assess fit, style, and overall appearance, reducing the need for physical dressing rooms.

2. Cosmetics and Beauty: Virtual Makeup Try-On: Customers can apply virtual makeup products, such as lipstick, eyeshadow, and foundation, to their own images to see how the products look on their skin.

3. Eyewear and Glasses: Virtual Glasses Fitting: Customers can try on various eyeglasses and sunglasses to find the perfect frame that complements their face shape and style.

4. Jewellery: Virtual Jewellery Try-On: Shoppers can visualize how different pieces of jewellery, such as necklaces, earrings, and rings, will look on them before making a purchase.

Future Enhancements:

The future of Virtual Try-On Systems holds promising opportunities for enhancement and innovation. As technology continues to evolve, here are several potential future enhancements for Virtual Try-On Systems:

1. Improved Realism and 3D Rendering: Advancements in 3D modelling and rendering techniques can provide even more realistic virtual try-on experiences.
2. Haptic Feedback and Sensory Integration: Integrating haptic feedback technology can enable users to feel the texture and weight of virtual clothing and accessories, enhancing the immersive experience.
3. Virtual Mirrors with Augmented Reality (AR): Virtual mirrors powered by AR can display real-time reflections of users wearing virtual items Body Scanning and Measurement Precision: Future enhancements can include more accurate body scanning technology for precise measurements. This can further improve the fit and style recommendations.
4. Augmented Reality (AR) Integration: Integrating AR into mobile apps and smart glasses can provide users with real-time virtual try-on experiences while in physical stores or at home. Users can point their devices at themselves and see virtual items overlaying their image.

12.CONCLUSION

In conclusion, the utilization of Deep Learning Virtual Try-On Systems has ushered in a remarkable era in the online fashion and retail industry. These systems, underpinned by the capabilities of deep learning and computer vision, have redefined the online shopping experience. Customers can now confidently visualize how a product will look and fit, mitigating the uncertainty associated with online purchases. As technology continues to evolve, we can anticipate even greater advancements in virtual try-on systems, offering heightened realism, personalization, and innovative features. The impact of these systems extends beyond the shopping experience; they are catalysts for sustainability, as they can help reduce the

environmental impact of excess returns and overproduction. With their ability to engage consumers, drive brand loyalty, and enhance the synergy between customers and retailers, Deep Learning Virtual Try-On Systems are destined to shape the future of fashion e-commerce. These systems are more than just technological marvels; they are the embodiment of a modern, immersive, and personalized shopping journey that has the potential to revolutionize the way we shop for clothing and accessories for years to come.

13.REFERENCES

1. Hongzhi Yin, Tong Xu, Shu Wu, Jiliang Tang, Zheng Qin, Guandong Xu, Heng Cao, and Xun Cai. "Fashion Recommendation with Explicit and Implicit Feedbacks." SIGIR 2019.

2. J. Tang, F. Xu, J. Li, X. Yang, F. Ouyang, P. Liu, S. Zhang. "Online Try-On Network: A One-to-Many Network for Garment Try-On." ECCV 2020.

3. Q. Liu, R. Hu, Y. He, and Y. Zhang. "Disentangled and Controllable Garment Synthesis." CVPR 2020.

4. I. S. Diakite, B. Ben Hedia, and B. B. Amor. "Garment Image Manipulation and Pose-Guided Person Image Generation." NeurIPS 2020.

5. N. Bonneel, S. Paris, and F. Durand. "Interactive Reflections in Augmented Reality." ACM SIGGRAPH 2010.

6. Y. Wang, S. Paris, and F. Durand. "Predicting Video Edits in Advance." ACM SIGGRAPH 2015.

7. M. Rubinstein, A. Shamir, and S. Avidan. "Improved Seam Carving for Video Retargeting." ACM Transactions on Graphics (TOG) 2008.

8. T. A. Höllerer, S. K. Feiner, J. Pavlik, S. B. Julier, B. MacIntyre, and M. Baillot. "Exploring MARS: Developing Indoor and Outdoor User Interfaces to a Mobile Augmented Reality System." Computers & Graphics 1999.

9. M. Hachet, S. Fleck, F. Vernier, and J. Royan. "Natural Feature Tracking for Augmented Reality on a Mobile Phone." Proceedings of the 7th IEEE/ACM International Symposium on Mixed and Augmented Reality 2008.

10. P. Fuchs, C. Rosenberg, B. Saldaña, M. A. Hirsch, H. Kuehne, and H. E. Rushmeier. "Synthetic Actors and Actresses as Personality and Appearance Preserving Caricatures." Eurographics Workshop on Virtual Environments 2000.