Virtual Fitting Room Using Deep Learing Methods

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Abstract- *A virtual dressing room could revolutionize the online shopping experience by providing customers with a realistic preview of how different clothing items look on their own bodies. This innovative technology could mitigate concerns about sizing and fit, ultimately boosting consumer confidence in making online apparel purchases. By implementing virtual dressing rooms, online sellers could not only improve customer satisfaction but also reduce the likelihood of returns, streamlining the overall shopping process. This transformative tool has the potential to redefine the landscape of e-commerce and set a new standard for personalized and convenient online shopping.*

I. INTRODUCTION

The growth of e-commerce has transformed the retail landscape, offering unparalleled convenience and accessibility to consumers worldwide. However, one persistent challenge that continues to impede the seamless adoption of online apparel shopping is the absence of a physical fitting experience. The inability to try on clothing before making a purchase often leads to uncertainty about fit, style, and overall satisfaction.In response to this challenge,This propose a groundbreaking solution: a Virtual Fitting Room (VFR) empowered by deep learning neural networks. The Virtual Fitting Room aims to bridge the gap between the digital and physical shopping experiences by providing users with a realistic and personalized virtual try-on environment.This project delves into the intricate integration of computer vision and machine learning techniques to create an immersive and accurate virtual fitting experience. The core of our solution lies in the utilization of deep learning neural networks, trained on a diverse dataset encompassing various body shapes and garment styles. By doing so, our system endeavors to emulate the interaction between clothing and individual body types, enabling users to visualize how different garments would look and fit on their unique physiques. Traditional online shopping often faces challenges related to fit, style, and overall customer satisfaction. However, with virtual fitting rooms powered by deep learning, users can now visualize how clothing items look and fit on their bodies in real-time, right from the comfort of their homes. This technology holds immense promise for both consumers and retailers alike, offering benefits such as increased confidence in purchasing decisions, reduced returns, and enhanced customer engagement. This project explores the concept of virtual fitting rooms and delves into the application of deep learning methods to enhancel their capabilities. We will discuss the underlying technologies, including body measurement estimation, garment simulation, augmented reality visualization, and personalized styling, all powered by advanced neural networks. Furthermore, we will examine the potential impact of virtual fitting rooms on the fashion industry, from improving the online shopping experience to driving innovation in product development and marketing strategies.

II. LITERATURE SURVEY

Title: An Enchance Virtual Fitting Room Using Deep Learning Methods
Authors: A.L Gamage
Description:

As the customer's experience in present fit-on rooms is considered as an essential part of the textile industry, these fit-on rooms play a huge role in the textile shops. It is quite an arduous method and generates problems like long queues, having to change clothes individually, privacy problems and wasting time. The proposed convolutional neural network-based Virtual Fit-on Room helps to prevent the above mentioned problems. This product contains a TV screen, two web cameras, and a PC. It captures the customer's body by using two web cameras and displays the customer's dressed body. The combination of CNN in Deep learning and AR processes the body detection and generates the customer's dressed object. The application uses the stereo vision concept to get body measurements. The system detects customer age, gender, face type, and skin tones which are used to recommend cloth styles to customers. Another requirement of this system is customizing styles according to the customer requirements and suggests different styles of clothes.

Title: Image-based virtual fitting room
Authors: jie chen
Description:

Using Cryptography and Steganography at the same time, we try to provide Biometric as well as Password security to voter accounts. The scheme uses images as cover objects

for Steganography and as keys for Cryptography. The key image is a Biometric measure, such as a fingerprint image. Proper use of Cryptography greatly reduces the risks in these systems as the hackers have to find both secret key and the template. The basic idea is to merge the secret key with the cover image on the basis of key image. The result of this process produces a stego image which looks quite similar to the cover image but not detectable by human eye. The system targets the authentication requirement of a voting system.

Title: Application Fitting Room Using Virtual Technology:A Systematic literature Review
Authors: jie chen
Description:

Due to the pandemic of 2020, the e-commerce industry has grown significantly as people have become more open to online shopping. According to eMarketer, retail e-commerce sales increased by 25.7%. One of the industries with the most growth is Fashion. Although according to many reports, the e- commerce fashion industry is expected to grow, there are problems in this online fashion industry where it's hard for customers to decide on buying the apparel that may fit them. One of the solutions for this problem is through fitting room application using virtual technology. A virtual fitting room can give novelty to customers a good experience where customers can virtually try clothes without actually wearing them. This research aims to review the procedure and algorithm involved in a virtual fitting room application. The research method uses a systematic literature review using the PRISMA framework. Based on our study, we can conclude that Virtual Fitting Room applications involve finding the lean body of the target image, then inserting the input image

Title: Generative model for fashion industry using deep neural networks
Authors: jie chen
Description:

The progress of deep learning models in image and video processing leads to new artificial intelligence applications in Fashion industry. We consider the application of Generative Adversarial Networks and Neural Style Transfer for Digital Fashion presented as Virtual fashion for trying new clothes. Our model generate humans in clothes with respect to different fashion preferences, color layouts and fashion style. We propose that the virtual fashion industry will be highly impacted by accuracy of generating personalized human model taking into account different aspects of product and human preferences. We compare our model with state-of-art VITON model and show that using new perceptual loss in deep neural network architecture lead to better qualitative results in generating humans in clothes**.**

III. PROBLEM STATEMENT

EXISTING SYSTEM

Existing virtual fitting approaches can be divided into two main groups, 3D model based and 2D image based . There are certain systems that produce results of 3D simulations of the human model and cloth using the physical parameters of the garments.In recent dressing simulations that can reproduce detailed drapes or folds of garments fit on various different body shapes. In the above systems simulations are done with the help of a predefined human model pictures.

DISADVANTAGES OF EXISTING SYSTEM:

- Achieving a high level of accuracy and realism in virtual try-ons remains a persistent challenge.
- The effectiveness of the VFR system heavily relies on the diversity and representativeness of the training dataset.
- Some users may find the virtual fitting process complex or time-consuming, especially if the interface lacks intuitiveness.

PROPOSED STATEMENT

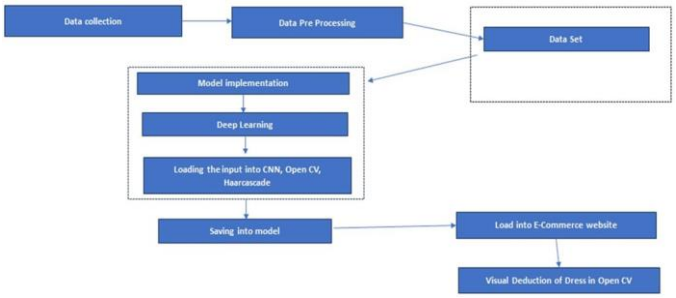
Our proposed Virtual Fitting Room (VFR) system leverages the power of Convolutional Neural Networks (CNNs), Haarcascade and OpenCV to create a sophisticated and accurate virtual try-on experience. Convolutional Neural Networks are employed to handle the complex task of extracting features from images, while OpenCV provides robust computer vision functionalities to enhance various aspects of the virtual fitting process The core of our system lies in the utilization of CNNs for both pose estimation and semantic segmentation. For accurate body positioning, the CNN-based pose estimation module identifies key landmarks on the user's body, ensuring precise alignment of virtual garments. Simultaneously, the semantic segmentation module, powered by CNNs, distinguishes between the user's body and the clothing item, allowing for a detailed separation that is essential for a realistic virtual try- on.OpenCV plays a pivotal role in augmenting the capabilities of our proposed system. Image processing techniques provided by OpenCV are employed for tasks such as color correction, edge enhancement, and contour smoothing, contributing to a visually appealing and realistic representation of virtual garments on the user. Additionally, OpenCV's robust features

aid in real-time tracking and adjustment of virtual garments as the user moves, enhancing the dynamic nature of the virtual fitting experience.

ADVANTAGES OF PROPOSED SYSTEM:

- Virtual try-ons reduce the time spent traveling to physical stores, allowing users to efficiently explore a wide range of clothing options online.
- This can result in cost savings related to transportation and other associated expenses.
- User can experiment with various styles and combinations to find the perfect look.

IV. SYSTEM ARCHITECTURE



V. SYSTEM MODULES

Module 1: Data Collection
Module 2: Data pre processing
Module 3:Model Implementation
Module 2:Loading the trained model
Module 2:prediction

MODULE 2 : Data Pre Processing

Image resizing and normalization to ensure uniformity in the dataset.

- Augmentation techniques to increase the dataset size and improve model generalization.
- Data cleaning to remove any irrelevant or corrupted images.

MODULE 3: Model Implementation

- Introduction to Convolutional Neural Networks (CNN) for image processing.
- Implementation of a CNN model for recognizing and segmenting clothing item.

MODULE 1: Data Collection

- Acquiring a diverse dataset of clothing items, including images from different angles and under various lighting conditions.
- Annotation of the dataset to label clothing categories, colors, and other relevant attributes.

MODULE 4: Loading the trained model

- Saving and loading the trained CNN model for later use.
- Integration of the trained model into the virtual dressing room application.

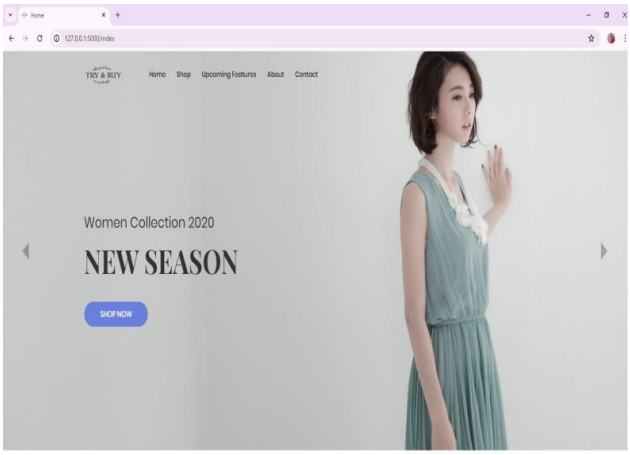
MODULE 1: prediction

- Using the loaded model to make predictions on new images.
- Overlaying segmented clothing items onto the user's image.
- Real-time rendering and updating as the user interacts with the virtual dressing room.

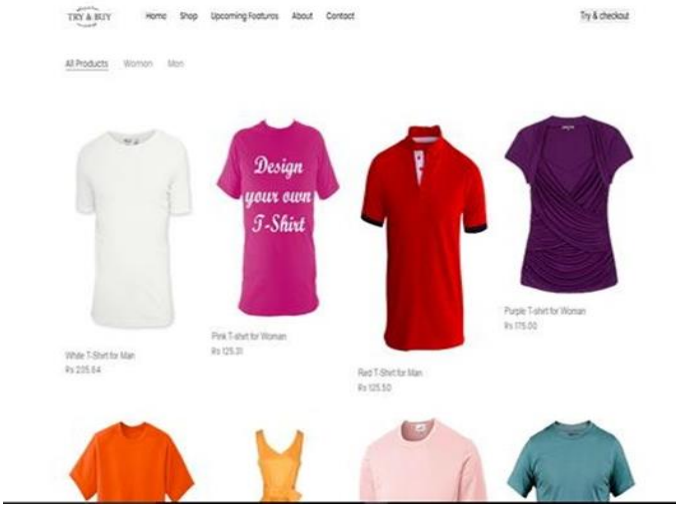
VI. CONCLUSION

In conclusion, the Virtual Fitting Room (VFR) presented in this paper, powered by deep learning neural networks, haarcascade and OpenCV, signifies a significant stride towards revolutionizing the online apparel shopping experience. The synergistic use of Convolutional Neural Networks for precise pose estimation and semantic segmentation, coupled with the versatile computer vision capabilities of OpenCV, creates a system that addresses longstanding challenges in the virtual try-on domain. The advantages of an immersive, accurate, and visually appealing virtual fitting experience contribute to increased user confidence, ultimately fostering a more enjoyable and satisfying online shopping journey. As technology continues to advance, the proposed VFR not only showcases the potential of deep learning and computer vision in the retail sector but also serves as a testament to the transformative impact these innovations can have on shaping the future of digital fashion retail. The ongoing refinement of such systems, coupled with collaborative efforts between researchers, developers, and retailers, holds the promise of further enriching the online shopping landscape and elevating customer satisfaction to new heights.

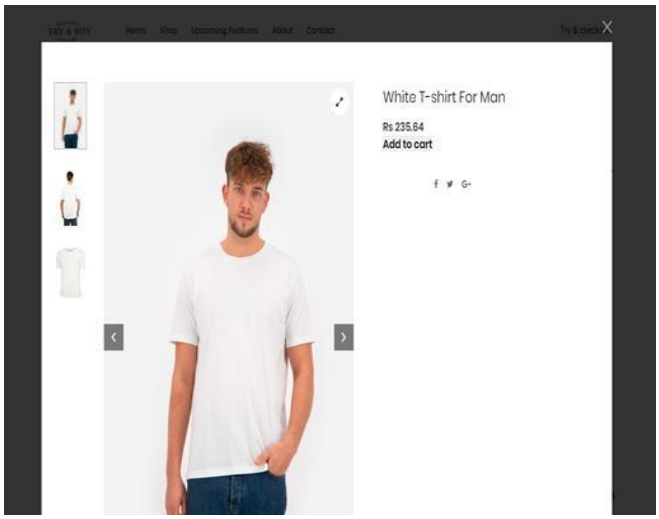
OUTPUT SNAPSHOTS HOME PAGE



PRODUCT DISPLAY PAGE



ADD TO CART PAGE



REFERENCES

[1] K.Srinivasan, K.Porkumaran, G.Sai Narayanan, "Intelligent human body tracking, modelling and activity analysis of video surveillence system:A Survey",Journal of convergence in engineering, technology and science,Vol.1,pp.1-8,2009.

[2] Max Mignotte,"Segmentation by Fusion of Histogram based K-Means Clusters in different color space"IEEE Transactions on Image Processing, Vol.17,pp.780-787,2008.

[3] F. Cordier, W. Lee, H. Seo, and N. Magnenat- Thalmann, "From 2D Photos of Yourself to Virtual Try-on Dress on the Web", Springer, pp.31–46,2001.

[4] D. Protopsaltou, C. Luible, M. Arevalo-Poizat, and N. MagnenatThalmann, "A body and garment creation method for an internet based virtual fitting room", in Proc. Computer Graphics International 2002 (CGI '02). Springer, pp. 105–122,2002.

[5] F. Cordier, H. Seo, and N. Magnenat-Thalmann, "Made-tomeasure technologies for an online clothing store",IEEE Comput. Graph. Appl.,vol. 23, no. 1, pp. 38–48, Jan. 2003.

[6] K.Srinivasan, K.Porkumaran, G.Sai Narayanan,"Skin colour segmentation based 2D and 3D human pose modelling using Discrete Wavelet Transform",Journal of Pattern recognition and image Analysis,Springer,Vol.21,pp.740- 753,2011.

[7] R. Brouet, A. Sheffer, L. Boissieux, and M.- P.Cani, "Design preserving garment transfer",ACM Trans. Graph., vol. 31,No. 4, pp. 36:1–36:11,