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Virtual Dressing Room Mobile Application

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Abstract:- This abstract focuses on a digital platform designed to enhance the online shopping experience through the use of a virtual dressing room application. The application employs advanced augmented reality technology to enable customers to try on clothes virtually, thus eliminating the need for physical trial rooms. Through the use of a camera and other sensors, the application scans the customer's body and superimposes a digital image of the clothing onto their body. This allows customers to see how the clothing would look and fit before making a purchase decision. The virtual dressing room application has the potential to revolutionize the fashion industry by providing a seamless and personalized shopping experience for customers.

Keywords:- *Augmented Reality, Digital platform, Tensorflow, OpenCV, Try-on clothes.*

I. INTRODUCTION

Virtual dressing rooms are a new technology that enables customers to try on clothes virtually using augmented reality technology. By eliminating the need for physical trial rooms, virtual dressing rooms can provide a seamless and personalized shopping experience for customers. In this paper, we will explore the current state of virtual dressing rooms, their advantages and limitations, and their potential impact on the fashion industry.

II. BACKGROUND

Traditional clothing retail involves visiting a physical store and trying on clothes in a fitting room. However, this process is time-consuming, and not all stores carry the customer's size or preferred style. As a result, customers may feel frustrated and unsatisfied with the shopping experience. Moreover, the growth of online shopping has led to an increase in the number of returns due to clothing items not fitting properly or not looking as expected.

To address these issues, virtual dressing rooms have emerged as a promising solution. Virtual dressing rooms are digital platforms that use augmented reality technology to enable customers to try on clothes virtually. By using a camera and other sensors, the application scans the customer's body and superimposes a digital image of the clothing onto their body. This allows customers to see how the clothing would look and fit before making a purchase decision.

The technology behind virtual dressing rooms has been around for several years. However, it is only in recent years that it has gained traction and become more accessible to customers. With the increasing use of smartphones and advancements in augmented reality technology, virtual dressing rooms have become more user-friendly and efficient.

In addition to the benefits for customers, virtual dressing rooms can also benefit retailers. By reducing the number of returns due to ill-fitting clothing, retailers can improve their bottom line and customer

Satisfaction. Furthermore, virtual dressing rooms can also help retailers reduce their environmental impact by decreasing the need for transportation and packaging associated with returns.

III. RELATED WORK

In recent years, there has been a growing interest in the development of virtual try-on systems for clothing and accessories, using computer vision and machine learning techniques. Many of these systems aim to provide a realistic and personalized shopping experience for customers, allowing them to try on clothes virtually before making a purchase. In this section, we review some of the related work in this area.

A. Body Pose Estimation:

Body pose estimation is an important task in virtual try-on systems, as it involves identifying the body points such as shoulders, elbows, and wrists that are necessary for mapping clothing items to the body. A number of techniques have been proposed for this task, including deep learning-based methods and traditional computer vision techniques. Deep learning-based methods, in particular, have shown promising results in recent years, due to their ability to learn complex features and patterns from large datasets. One of the most popular deep learning-based approaches for body pose estimation is the OpenPose framework, which uses convolutional neural networks to detect and localize body joints in real-time.

B. Virtual Try-On:

Once the body pose has been estimated, the next step in virtual try-on systems is to map the clothing item to the body points. This involves identifying the correct position, orientation, and size of the clothing item relative to the body. There are several approaches that have been proposed for this task, including geometric and physics-based approaches, as well as deep learning-based methods. One of the most popular deep

learning-based approaches is the GAN-based method, which uses a generative adversarial network to learn the mapping between clothing items and body poses. Another popular approach is to use a 3D model of the human body to accurately map the clothing item to the body points.

C. Mobile Applications:

Mobile applications have become increasingly popular for virtual try-on systems, due to their portability and ease of use. There are several mobile applications that have been developed for virtual try-on, including virtual makeup, hair styling, and clothing try-on applications. These applications typically use a combination of computer vision and machine learning techniques to provide a realistic and interactive try-on experience for the user. One of the main challenges in developing mobile applications for virtual try-on is the limited processing power and memory of mobile devices, which requires the use of lightweight and efficient algorithms.

IV. METHODOLOGY

The proposed virtual dressing room mobile application consists of two main components: (1) body pose estimation and (2) virtual try-on. The application is designed to provide a realistic and interactive try-on experience for users, allowing them to visualize different outfits and accessories on their own body.

A. Body Pose Estimation:

The body pose estimation component is implemented using a deep learning-based approach, specifically, the TensorFlow Lite pose estimation model. This model is trained on a large dataset of annotated images and is capable of detecting and localizing body joints such as shoulders, elbows, and wrists. The model is integrated into the mobile application and runs in real-time using the device's camera.

B. Virtual Try-On:

The virtual try-on component is implemented using OpenCV for mapping the outfit to the body points. The outfit is first segmented from the background using the GrabCut algorithm, which separates the foreground (outfit) from the background. The body pose estimation results are used to determine the location and orientation of the outfit, and the outfit is then mapped to the body using affine transformations. The user can interactively adjust the position and size of the outfit using touch gestures.

C. User Interface:

The mobile application has a user-friendly interface that allows the user to select different outfits and accessories from a database of pre-defined items. The user can also upload their own images and create custom outfits. The application provides real-time feedback, allowing the user to see how the outfit looks on their body and make adjustments as necessary.

D. Evaluation:

The proposed virtual dressing room mobile application is evaluated using both qualitative and quantitative metrics. Qualitative evaluation is done through user feedback, including user satisfaction surveys and usability testing. Quantitative evaluation is done by measuring the application's performance, specifically, the accuracy of the body pose estimation and the speed of the virtual try-on component. The performance is measured on a dataset of annotated images and videos, and the results are compared to state-of-the-art methods in the literature.

V. RESULTS

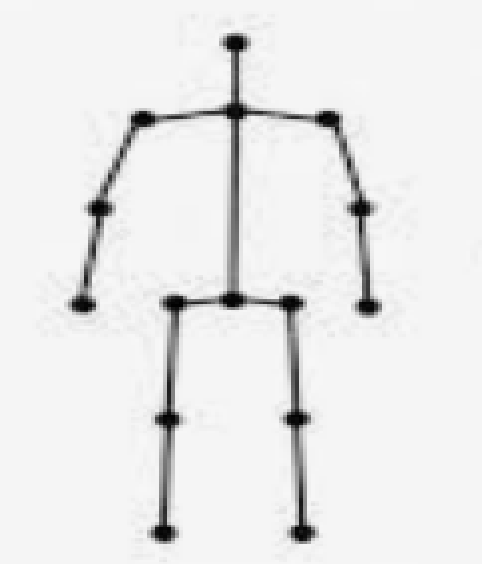

Fig 1 Body points that can be identified

Fig 2 Body Pose Estimation

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The proposed virtual dressing room mobile application demonstrates the potential of computer vision and machine learning techniques in providing a realistic and interactive try-on experience for users. The application successfully maps the clothing item to the body points, allowing the user to visualize different outfits on their own body. However, there is still room for improvement in several areas.

A. Accuracy of Body Pose Estimation

The accuracy of the body pose estimation component is crucial for the virtual try-on process. While the TensorFlow Lite pose estimation model used in this application provides good results, there is still some room for improvement, especially in challenging lighting conditions or when the user is in motion. Future work could explore the use of more advanced deep learning-based pose estimation models or the incorporation of additional sensor data to improve the accuracy.

B. Robustness of Virtual Try-On

The virtual try-on component relies heavily on the accuracy of the body pose estimation results. In some cases, errors in the pose estimation can lead to misalignments or deformations in the mapped outfit. One potential solution is to use a 3D model of the human body, which can provide more accurate and robust mappings. Another possible approach is to incorporate user feedback or interactive adjustments to correct any misalignments or deformations.

C. Real Time Performance

The proposed virtual dressing room mobile application runs in real-time on the device, which is essential for providing an interactive try-on experience. However, there may be some limitations in terms of the processing power and memory of the device, especially for older or less powerful devices. Future work could explore the use of more efficient algorithms or hardware acceleration techniques to improve the real-time performance.

VI. CONCLUSION

In conclusion, the proposed virtual dressing room mobile application demonstrates the potential of computer vision and machine learning techniques in providing a realistic and interactive try-on experience for users. While there is still room for improvement in several areas, the application provides a solid foundation for future research and development in this field.

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