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Try Before You Buy-Virtual Dressing Room

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A B S T R A C T

New trends are constantly emerging in the ever-evolving fashion industry, and many fashion aficionados want to experiment with them frequently. Nevertheless, touching objects in public without feeling the need to sanitize your hands has grown challenging since the COVID outbreak. For those who are constantly worried about their health, trying on new clothes at retail establishments can be quite challenging. Due to this, more people are buying online, but this also presents the issue of clothing that is either too tight or too loose, requiring frequent returns before the consumer finds the correct size in order to address this issue, our idea introduces a virtual dressing room where users are able to use augmented reality (AR) technology so they can precisely scan their body measurements, explore various designs, and see how they would appear in those outfits. Customers are able to experience a realistic clothing fitting in 3D view by using virtual dressing room, a new method of purchasing. Customers are unsure about how the dress will appear on them because trying on various dresses at malls takes a lot of time.

Keywords: Virtual Dressing Room, Augmented Reality, 3D

1. Introduction

Due to the rapid growth of technology development, our daily life is heavily affected by smart systems, which facilitates our activities. For instance, online shopping grew up very fast. People are getting more used to online shopping, online auctions, etc., to purchase their interested products. This way of transaction has become the main trend and it brings great convenience to customers.

However, an issue for buying clothes online is that client cannot try the product before he/she get that product. The feeling after dressing on affects the client decision about buying the clothes. Therefore, there is an increasing demand to develop virtual dressing room to simulate the visualization of dressing.

1.1 Problem Statement

- Inability to Try Before Buying in E-Commerce.
- High rate of returns, while shopping online.
- Time-Consuming In-Store Try-Ons.

1.2 Objectives

- To explore and understand the technology foundation of virtual dressing rooms, such as computer vision, machine learning, augmented reality, and virtual reality, as well as how these components work together to provide a smooth user experience.
- Create and implement a simple to use user-friendly interface for the virtual dressing room that allows users to make it an easy and enjoyable experience.
- To create a realistic virtual clothing fitting and allows customers to see how clothes will fit them, use advanced 3D modeling and body tracking techniques.
- To offer size-based recommendations.

2. Literature Survey

In our exploration of the history of virtual dressing rooms, we go back to the key turning points and inventions that shaped the development of this technology. Examining the technology that makes this futuristic shopping experience possible reveals the fundamentals of virtual dressing rooms, such as augmented reality (AR), virtual reality (VR), computer vision, and machine learning. [1]

The Aladdin Masri present a virtual dressing room application leveraging the Microsoft Kinect sensor. Their proposed method focuses on extracting the user from the video stream, aligning models, and implementing skin color detection. [2]

The process involves utilizing joint locations for positioning, scaling, and rotation, ensuring accurate alignment of 2D cloth models with the user. To address unwanted occlusions, they employ skin color detection on the video feed. [3]

The primary challenge addressed is achieving precise alignment of the user and cloth models in terms of position, scale, rotation, and ordering. The project is realized in the real-time C# programming environment, allowing for instantaneous implementation and interaction. [4]

The Nauman Zafar Hashmi, Aun Irtaza, Wakeel Ahmed, Nudrat Nida aim to overcome limitations associated with Kinect sensor input in virtual dressing rooms. They introduce a novel approach by presenting a dynamic virtual dressing room utilizing a webcam for video input, providing users with an interactive virtual dress fitting experience. [5]

Their proposed model involves several key steps, including face and skin detection, lower body detection, and dynamic distance estimation. These components contribute to a precise virtual reality experience, enhancing the overall functionality and accessibility of the virtual dressing room application. [6]

The Rong Li ,Kun Zou, Xiang Xu, Yueqiao Li and Zan Li integrate essential techniques, such as 3D modeling, collision detection, and real-time rendering, in their work. [7]

They introduce a comprehensive framework for a virtual Try-On system, designed to be flexible and accommodate various functions, including garment design, body modeling, and clothing animation. [8]

Users have the ability to observe clothing animations from different angles and can customize additional features like actor hairstyles and accessories. Furthermore, the system assesses customer compatibility to guide them in selecting suitable clothes, offering a holistic and interactive experience. [9]

The virtual dressing room developed by the Ari Kusumaningsih; Arik Kurniawati employs augmented reality technology to enhance the shopping experience. Specifically, they utilize 3D models of Madura batik cloth superimposed within the live feed from a Kinect sensor. [10]

Through 3D rigid transformation, the batik cloth model is seamlessly adapted to the customer's movements in real-time, creating the illusion of the customer wearing the virtual dress in the live video view. The system is constructed using the SimpleOpenNi library and Microsoft Kinect SDK, showcasing a fusion of accessible tools to achieve an efficient and interactive virtual shopping experience. [11]

3. Proposed System

Our project offers a user-friendly virtual dressing room experience with the goal of revolutionizing online buying. Unlike conventional internet purchasing, where customers frequently have to guess sizes and deal with ambiguous product looks, our method guarantees accurate size and lifelike clothes portrayal. You can virtually try on the clothing you're interested in by using your camera to see yourself wearing it. We've used the camera on your device to our advantage so you can virtually try on clothing in real time and shop with the assurance that comes with knowing exactly how an outfit will look on you.

In addition, we will inquire about your size and style to provide you with personalized outfit recommendations. Modern body scanning technology will be used in our virtual dressing room to precisely measure the user's body dimensions. The basis of our size-based recommendation engine will be these measurements. Customers and retailers will both profit from this tailored strategy, which will improve the overall shopping experience and dramatically lower the percentage of returns for misfitting of clothing. By filling in the holes in the present online purchasing experience, we hope to make online shopping entertaining, educational, and individualized.

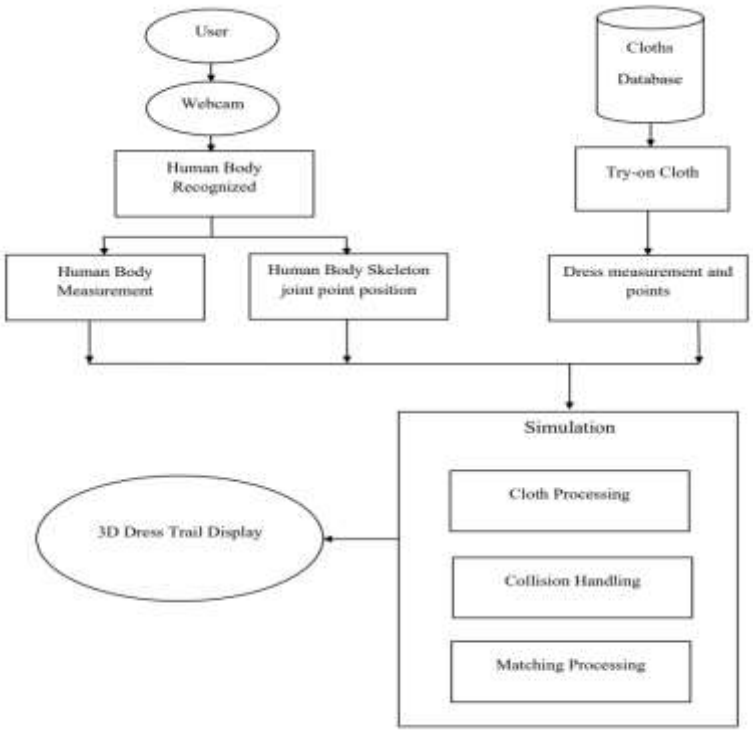

Fig. Block diagram proposed system

4. Proposed Methodology

- **Computer Vision and Machine Learning Software Library - OpenCV:**

It is a library of open-source tools for machine learning and computer vision. Key point recognition, body tracking, and facial detection are some of the applications for it. OpenCV can be used to analyse the collected photos or video feed in order to compute body measurements. This information is necessary to ensure that the virtual clothes fits the user's body properly and to provide precise size recommendations. OpenCV can be used to track and update the position and orientation of the virtual clothing items in real-time when users move or turn during the virtual try-on, resulting in a smooth and engaging experience.

- **Augmented Reality (AR) Technologies-AR.js**:

A free and open-source JavaScript package for building augmented reality experiences that run right in web browsers. AR.js allows users to interact with virtual apparel. To have a better idea of how the apparel fits and appears from various perspectives, users can move, scale, and rotate the 3D clothing models.

In order to make better purchasing decisions, users may see how various apparel sizes and styles fit on their own bodies in real-time. Users may see themselves wearing the virtual clothing using a virtual mirror effect created by AR.js, which improves the experience of putting on garments in a real changing room.

- **3D Modeling and Animation Software-Blender:**

This powerful 3D modeling and animation program may be used to produce lifelike 3D models of apparel and improve the visual experience. Blender is well known for its ability to model 3D objects.

The look, feel, and composition of actual apparel items can be faithfully portrayed by these models. To animate the garment models, Blender comes with a fabric simulation system. This makes it possible for virtual clothes to move and drape realistically when the user interacts with it, giving the try-on experience a realistic feel.

5. Benefits of the Proposed System

- People could utilize this to see how different outfits fit them.
- Time and cost saving.
- An easier and quicker way to shop

- Reduce the product returns due to sizing issues by providing a realistic virtual try-on feature
- Recommendation system will gives the recommendation products on the basis of size details.

6. Conclusion

It's fun, practical, and simple to use the Virtual Dressing Room. Because it is more advantageous than in the past, provides an online shopping experience, and operates in an environment where consumers perceive less risk, it can increase their buying intention. Through this application, we are able to take advantage of the enormous potential that the science of human-computer interaction offers, and we also lay the groundwork for future research and development of this technology that will be applied to other useful services and systems.

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