

SMART VIRTUAL TRAIL ROOM APPLICATION

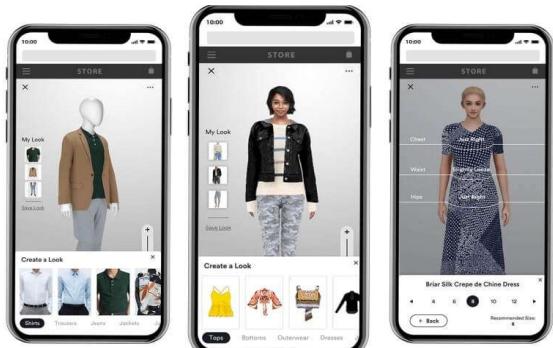
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Abstract - The Smart Virtual Trail Room Application is a modern digital solution designed to improve customer experience by allowing users to see how clothes, jewelry, glasses, and hats would look on them without physically visiting a store. Though online shopping is becoming increasingly popular among consumers, a significant number of them still hold reservations when it comes to buying clothes since they are unable to judge the fitting, style or suitability through usual production images. The method uses a camera to capture a picture of the user and afterward, computer vision algorithms are applied to adjust the body shape and stance, thus simplifying the imaging and fitting process. The chosen garments, rings, shades, and hats out of the online catalogue are then perfectly blended and showcased on the user's body in real time giving a genuine try-on experience.

Keywords - Image processing, Online Trial Room, Pose Estimation, 3D visualization



INTRODUCTION

The Smart Virtual Trail Room Application is an innovative technology. The advent of technology has completely altered the way consumers through online fashion world. In its earlier stages, online shopping just confined customers to simple 2D and 3D pictures along with size charts, thus making it rather difficult to accurately judging how these outfits and other things would look on them or fit their bodies. Never less, the users most were uncertain and uncertain about the idea of placing an order as their main take were if the product would well with users style, surfaces, and comfort level, which in turn led to lowering of purchase confidence and increasing

return rates. The has come up with a solution to this Problem by enabling the customers to try out the clothes and other products through the live image taken by and the camera on their device. A system like this is a mixture of machine learning, computer vision, and image processing filtering, it takes the users body outline, marks the key points, and accurately places the chosen clothing and other items on either a live image or a picture. Users are able to see a large variety of clothes and other items, apply different looks, and do size guesses while getting instant feedback without the trouble of actually wearing the clothes and other products. It is a win situation on the one hand retailers receive satisfied customers, less returned goods, and higher sales conversion rates plus more interaction.

1. PROBLEM STATEMENT

Applying standard product images, online shoppers very frequently are not able to correctly estimate the look and fit of clothing and other items on their bodies this led to confusion, low purchase confidence, and increased product returns. The realistic representation of digital clothes will be a virtual dressing room's contribution, thus permitting consumers to make informed decisions that will eventually result in higher approval and lower return rates.

2. IMPLEMENTATION METHODOLOGY

2.1 Detecting and Sizing the Body

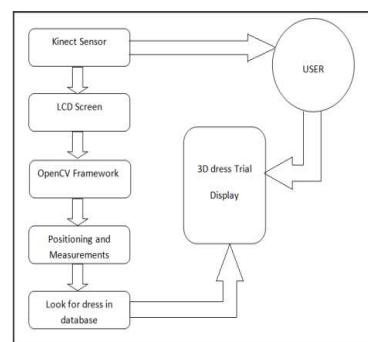


Fig 2.1: System Architecture Diagram

The body detecting and sizing process in the Virtual Trial Room is vital to ensuring that the garments and store fittings and rendering of the clothes are realistic and accurate. The system begins with capturing the image or video of the user through a camera, and then it applies techniques from computer vision to delineate the human body silhouette. The pose estimation algorithm detects key points on the body such as shoulders, chest, waist, hips and legs. These points are then used for digital body mapping to determine the size. The machine learning models for reflex body dimensions predictions rely on proportions so that the physical entry is not needed. The accurate body sizing permits the correct alignment, scaling and positioning of the clothes for an easy going virtual try on experience. It symbolizes the extraction of the users exact physical traits for the fair garment placement among others. The live camera feed is used by the system to do the capturing of the user and then it cuts off the related so that only the users body area is visible.

The advanced algorithm do pixel, contour, and skeletal structure analysis to locate the major body joints and shapes. The points that are detected tell the system the height, width, and proportion ratios of the user, and these measurements have been done automatically. The system then knows what kind of body the user. A virtual scaling has to be done to ensure that the selected clothing seems to fit well, move along with body and give a realistic visual experience.

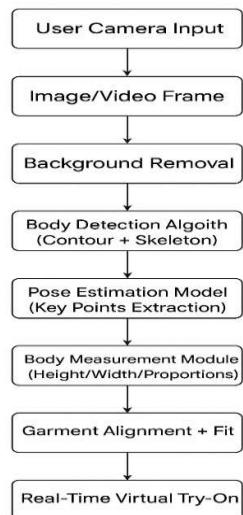


Fig 2.1: Detecting & Sizing the Body

2.2 Face Detection

The virtual trials come alive and produce more visuality is the accurate detection of the face of a user within the virtual try-on.

The user's facial image is taken by the camera and computer vision algorithms are applied to the image to detect the main facial landmarks- the eyes, nose, mouth, ears, and jawline, among others. These landmarks facilitate the placing of accessories such as hats, glasses, and earrings on the user's face. Furthermore, advanced techniques also track head position and decode facial expressions, all of which contribute to the real-time adjusting of virtual items.

The camera on the user's device captures the user's face and the system, through advanced computer vision techniques, then instantly identifies and analyses the user's facial features. This process makes it possible for the application to place virtual accessories, makeup, glasses, earrings, or hats on the user's face in a very realistic way.

2.3 Image Masking

Image masking in a Smart Real Trial Room is a vital technique used to isolate and manipulate specific parts of an image, such as a user's body or face, while keeping the background separate. By creating precise masks around clothing or accessories, the system can realistically overlay virtual garments, clothes, or jewelry onto the user's image. This allows users to try multiple products without physically wearing them first. Advanced masking techniques handle complex shapes and movements, ensuring the smooth integration of virtual items.

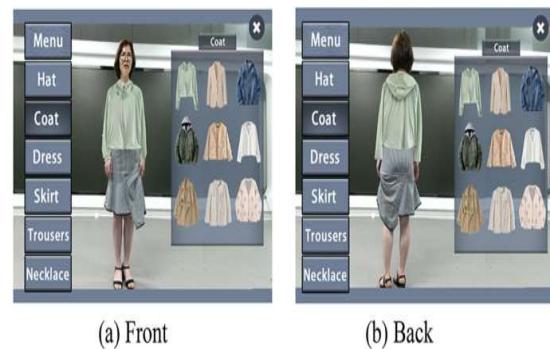


Fig 2.3: Image Masking

2.4 Edge Detection

Edge detection in a Smart Real Trial Room is a basic computer vision method that helps in separating and outlining the shapes of things, like a person's body or hair, etc. The detection of sudden changes in pixel brightness enables the system to differentiate the user accurately, meeting user requirements for clothing, accessories, or even facial features. These edges can then be used to guide the accurate positioning of virtual products, i.e., it is guaranteed that clothes, glasses, or jewelry will fit on the user's

image seamlessly. The technique of edge detection is one of the main factors that contribute to the virtual try-on experience being more realistic, as it clearly separates the operator from the background, thus improving product alignment and providing visually accurate previews before the purchase.

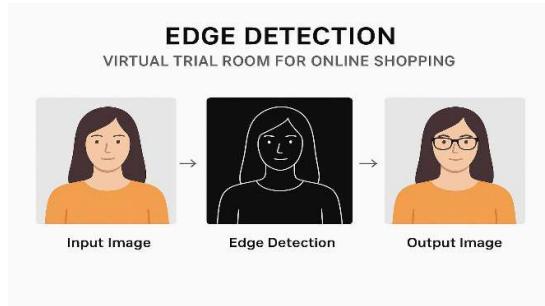


Fig 2.4: Edge Detection

3. RELATED WORK

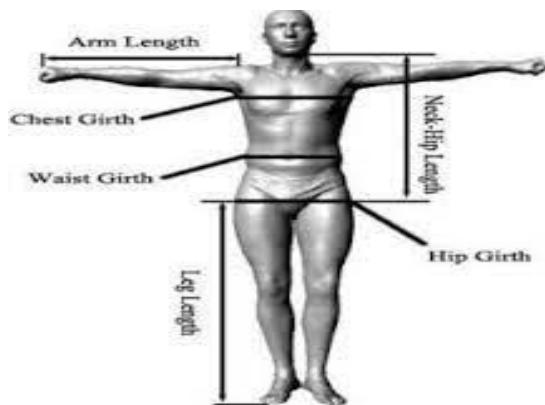


Fig 3.1: Related Work Diagram

The Smart virtual trial rooms have related work that mainly concentrates on the combination of computer vision, augmented reality, and machine learning technologies to make the internet shopping experience better. Among the potential techniques were body scanning in 3D, pose estimation, image filtering, and masking to enable the users to simulate the process of trying on clothes or other items with high accuracy. Moreover, deep learning systems took the fitting of garments and their realism to a whole new level, whereas edge-detection and segmentation techniques were applied to separate the user from the backdrop. User interface designs have also been researched that will ensure the interaction is intuitive, garment swapping is efficient, and visualization is realistic, which altogether will help to decrease user's uncertainty and increase confidence in purchasing clothes online.

4. BLOCK DIAGRAM

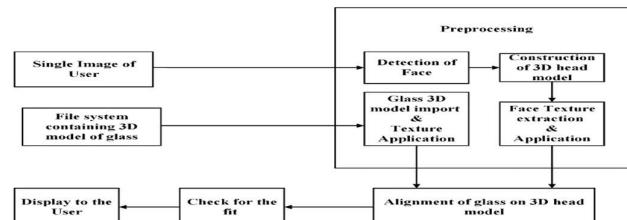


Fig 4.1: Block Diagram

5. RESULT

Create an account

Name	<input type="text"/>
Email	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="Sign Up"/>	Already have an account? Log in

Login

Email	<input type="text"/>
Password	<input type="password"/>
<input type="button" value="Log In"/>	Create an account

Virtual Trial Room for Online Shopping

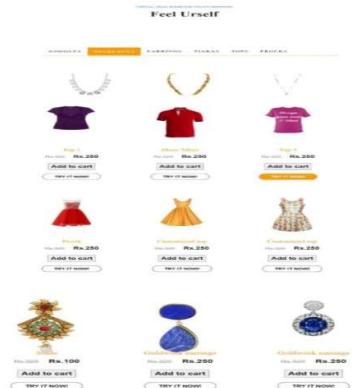




Fig 5.1: Screenshots for Web Application

6. CONCLUSION

The Smart Virtual Trial Room Application by allowing customers to visualize clothing and other items on a digital representation of themselves before purchasing. This technology reduces uncertainty, lowers return rates, and increases user confidence by providing realistic previews of fit and style. It enhances user engagement, supports personalized recommendations, and offers retailers competitive advantages. By combining AI, image processing, image filtering, and AR, the Virtual Trial Room bridges the gap between virtual and in-store shopping experiences effectively.

7. REFERENCES

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