Grenze International Journal of Engineering and Technology, June Issue

Utilizing Deep Neural Network for Upgrading the Virtual Try-On

Sushma D S[1], Shamanth K[2], Sinchana B Raj[3], V Kiran[4] and Syeda Subiya[5]
[1-5]Department of Computer Science and Engineering, Rajeev Institute of Technology, Hassan, Karnataka, India
Email: shamanthkraj07@gmail.com

***Abstract*—The twenty-first century has seen the emergence of fashion as a way of life. The amount and type of clothing worn may vary depending on physical stature, gender, as well as social and geographic considerations. The majority of people still associate shopping with their in-store shopping experience when they think about shopping. Although customers can try on clothing in-store, there aren't enough trial rooms, so the process takes too long. Our objective is to develop a virtual system that is dynamic, engaging, and astonishingly realistic and that enables users or clients to choose from a wide range of clothing designs before putting those outfits on virtual humans.In this study, we proposed a system that facilitates everyday attire synchronisation. The initiative to create a virtual dressing room with a live camera stream may change how someone shopping for and dresses themselves. By utilising "Virtual Reality," customers may try on a variety of things without really wearing them. The advantage of doing things this way is that trying the clothes on physically would take less time and effort. This initiative helps with market management by lowering the demand for shoppers to try on every piece of apparel. By not keeping a huge inventory on hand, businesses can also save time and space.**

***Index Terms*— Virtual dressing room, computer visualization, image processing, feature extraction.**

I. Introduction

Due to the growing demand for virtual dressing rooms that can replicate the visual component of dressing, a virtual changing room setting is being established to improve the accessibility and time efficiency of trying on clothing, which is particularly useful in situations like online shopping where trying on clothing is not possible, and the identification of the user and their physical components is crucial in achieving precise alignment of the cloth models with the user in terms of placement, scale, rotation, and ordering, and various techniques for body component detection and posture assessment have been proposed in the literature to address this issue, while web cameras enable online shoppers to better manage costs. which have been used, CNNs are superior for image recognition tasks**.**

II. Literature Survey

1)When dressing a person virtually, the Virtual Dressing Room approach calls for separating the subject from the background as little as possible while accounting for changes in lighting. The top and lower body shape is then detected using a Laplacian filter. edge detection is next. The next step is the extraction of feature points using the

Grenze ID: 01.GIJET.9.2.438

fundamental human anatomy. These places are used as a reference to precisely bend the sample shirt to fit the wearer.

2)With the help of this effort, an app for a virtual changing room was successfully constructed. The main objective of developing a real-time, platform-independent application was fulfilled. Sizing options range from XS to XL, and users can move the apparel around with the cursor keys and, if necessary, adjust its width with the scroll

button.Before taking a photo themselves to demonstrate how the clothing fits, they may also opt to experiment with various items.

3) The shopping experience would be significantly enhanced by the creation of a mobile application that uses open CV and TensorFlow lite to enable consumers to virtually try on clothing.Al proposed an approach that would utilise an Euclidean Matching Module to better align the input material on the human representation. The customer uses the app for smartphones to virtually try on the outfit at that point.

III. System Analysis

A. Problem Statement

Designing a solution for reducing human time and making their online shopping better by designing a virtual styling room using live video feed it also Provides a virtual room to try apparel through e-commerce websites before buying it.

B. Existing System

Clothing for certain body parts, like the head, feet, arms, and face, can be found in the current virtual changing rooms. The current method demands us to try on every piece of clothes, which most people find annoying or difficult to do. The model's stability has been found to be unstable when processing photographs of people taken under diverse lighting conditions, distinct ambient contexts, and unusual poses. AI is used by numerous online retailers, namely Lenskart, Purple, and others.to produce results for eyewear or makeup in fitting rooms.

C. Proposed System

The main objective of this project is to make users' online shopping experiences better and simpler. It aims to create a "Augmented Reality" fitting room to save time. allows shoppers to try on various pieces of apparel without touching them before making a purchase. reduces the need for manual or physical clothing putting on, which also reduces the risk of becoming covid. It enables customers to choose more carefully.The main objective of the project is to establish an actual relationship between the user and virtual clothing.

IV. Objective

The primary aim of this paper is to create a VDR that accurately represents the appearance and texture of clothing and can be adjusted to fit various body types. By enabling customers to quickly and easily try on clothes and select the best fit for them, we can leverage the vast potential of human-computer interaction. There are three compelling reasons to consider virtual try-ons, including secure fitting procedures that can replace traditional changing rooms, improved conversion rates by empowering customers to make informed purchases and providing inclusive experiences, and the ability to convert casual online browsers into paying customers with personalized and engaging dressing room experiences .

V. Methodology

Step 1: The user must stand in front of the computer screen or LED screen on the device (depending on the name of the figure).

Step 2: The device's camera will interact with the user's body in a way that is akin to how it recognises the structure of the user's body and, with the help of particular alignments, permits the addition of a particular product to the user's body.

Step 3: Because this project is real-time, OpenCV and its many modules will react to the user's alignment and assign it to the user in an appropriate way.

Step 4: The NumPy framework will consider the user's location and the size of the human body.

The calculation's outcomes will be shown on the LED screen when the user is testing a particular item.

Step 5: The project's database is obtained from the source (through the Internet).

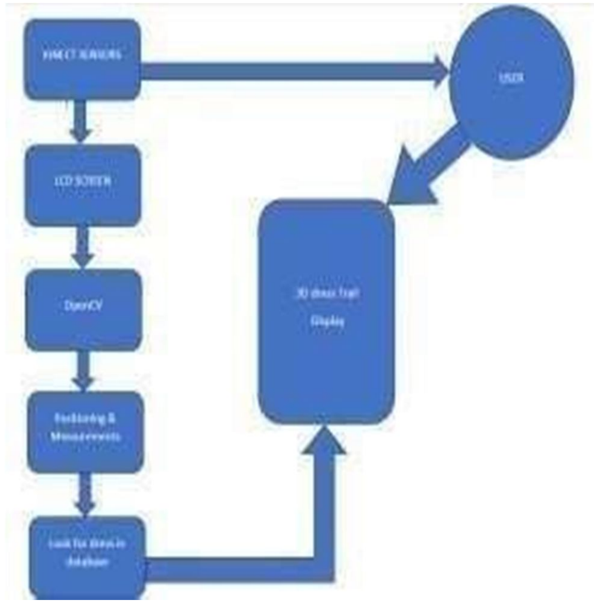

Fig 5.1: System Architecture

Step 6: The product is now accessible for testing by the user following database-based calculations and alignment.
Step 7: The entire procedure is viewable on the system's LED screen.
Step 8: The project is now prepared for its trial

A. Use Case Diagram

The main elements and operations that make up the system are shown on the use case diagram. The processes are referred to as "use cases," and the key components are referred to as "actors."Each use case showcases a feature that the system provides users with and outlines the manner in which the system interacts with outside actors. In the utilisation case diagram, there is a stick figure representing the actor, along with his name, and ellipses around the use case name. All use cases are contained within a rectangle. The use case diagrams for the Manager and user profiles for the virtual styling studio are shown in Figures 5.1a and 5.1b, respectively. A manager can add and delete clothing. The user is able to select, try on, and purchase the apparel.

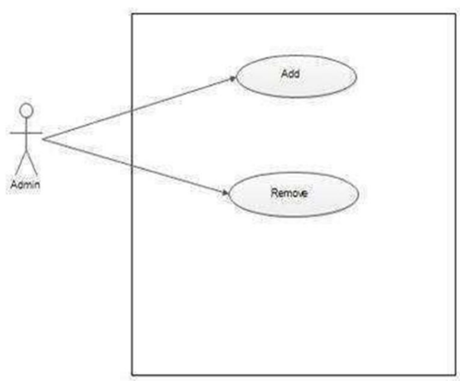

Fig 5.1a: Use Case Diagram for Admin

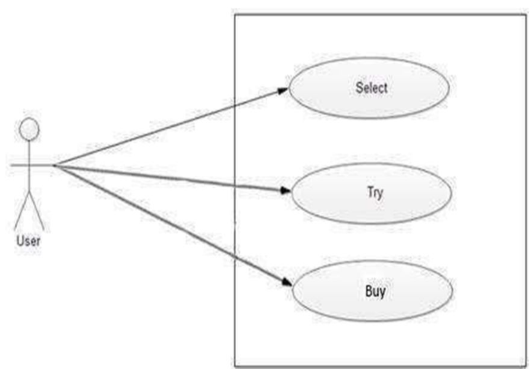

Fig 5.1b: Use Case Diagram for User

B. Control Flow Diagram

A system flow diagram graphically and sequentially shows the key steps in an organised process. The types of data that will be processed into and exported from the network, as well as its location, destination, and storage locations, are shown in a system flow diagram. Figure 5.3 depicts the control system flow diagram for the virtual style room with a live video feed.

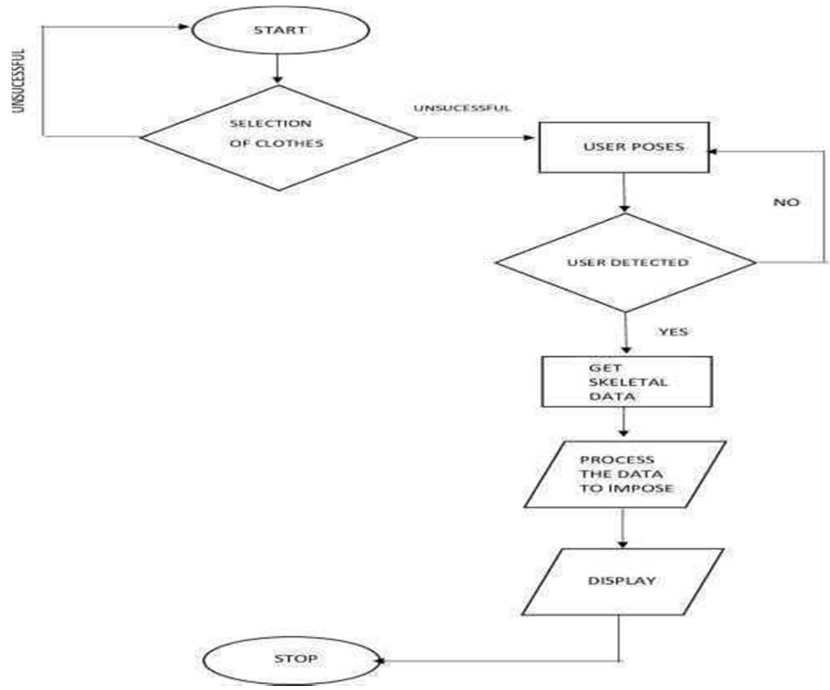

Fig 5.2: Control Flow Diagram

C. Activity Diagram

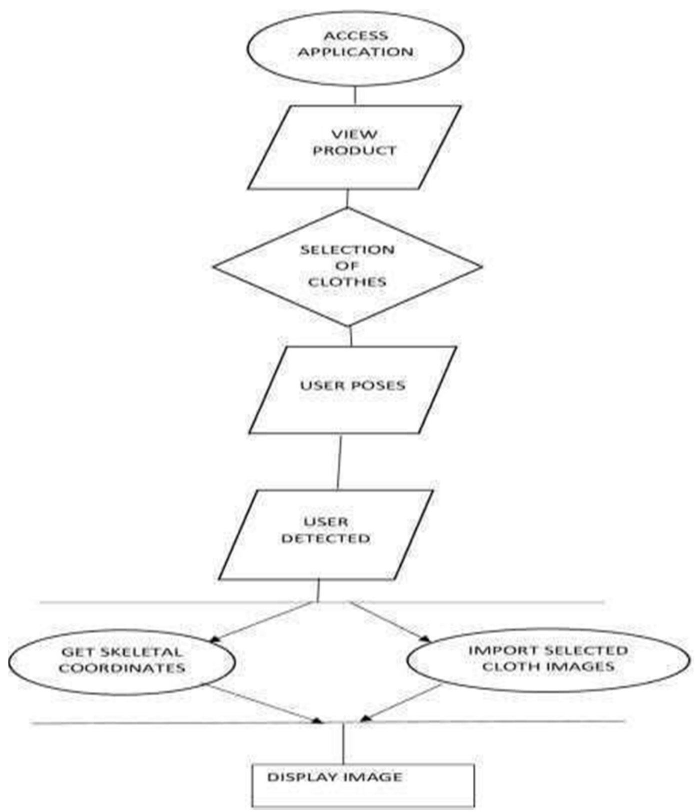

Fig 5.3: Activity Diagram

The activity diagram is yet another essential UML diagram used to represent the dynamic components of the system. A flow diagram that illustrates how one action leads to another is called an activity diagram. A system operation could be used to describe the action. In the control flow, one action leads to the next. This flow could be simultaneous, either sequential or branched. Activity diagrams deal with all types of flow control by utilising various sections like fork, join, etc.

VI. IMPLEMENTATION

A. Pseudo code

A high- position, informal description of how an algorithm or computer software operates is appertained to as pseudocode in common parlance. Although it adheres to the structural conventions of programming languages, it's written for mortal reading rather than machine reading. It's utilised to produce the rough figure or plan for a programme. Pseudocode reduces the length of a programme while leaving out supporting details. System contrivers produce pseudocode to insure that programmers understand the conditions of a software design and align their law rightly.

B. The segmentation algorithm

When we have the clothing segment, we can compare it geometrically to the clothing found in stores. To make the in-store apparel as geometrically comparable to the model clothes as possible, our current objective is to be able to learn transforms. You can use the illustration below to illustrate this. The illustration is a grid of six pictures.The instore clothing is shown in the top left, the model's clothing is shown in the top right, and the transform applied to the in-store clothing is shown in the top middle.

C. Geometrically matching module

When we have the clothing segment, we can compare it geometrically to the clothing found in stores. To make the in-store apparel as geometrically comparable to the model clothes as possible, our current objective is to be able to learn transforms. You can use the illustration below to illustrate this. The illustration is a grid of six pictures.The instore clothing is shown in the top left, the model's clothing is shown in the top right, and the transform applied to the in-store clothing is shown in the top middle.

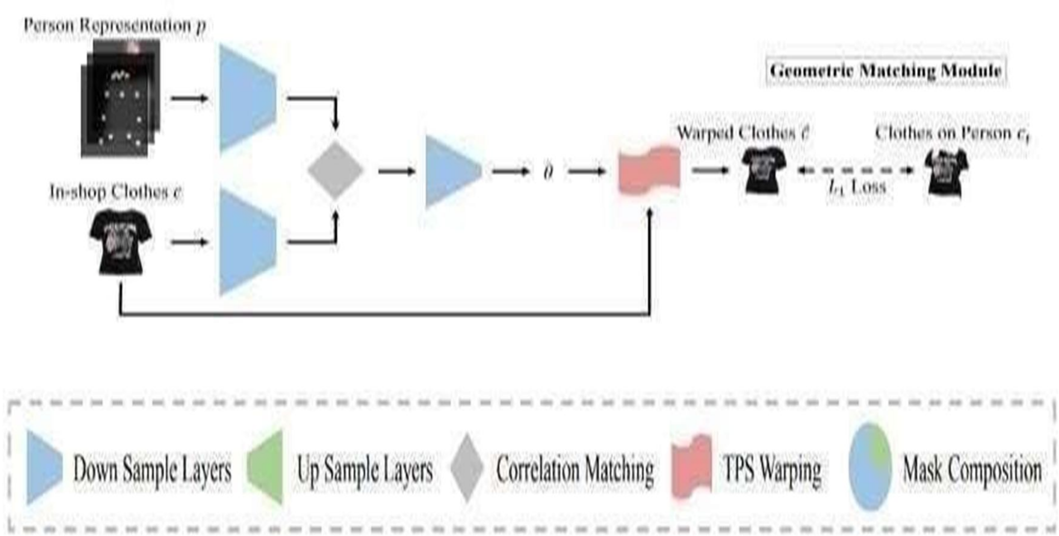

Fig 7.3.2:- Geometric Matching Module

D. Try- on- module

When we've the apparel member, we can compare it geometrically to the apparel set up in stores. To make the in- store vesture as geometrically co mparable to the model clothes as possible, our current ideal is to be suitable to learn transforms. You can use the illustration below to illustrate this. The illustration is a grid of six filmland.
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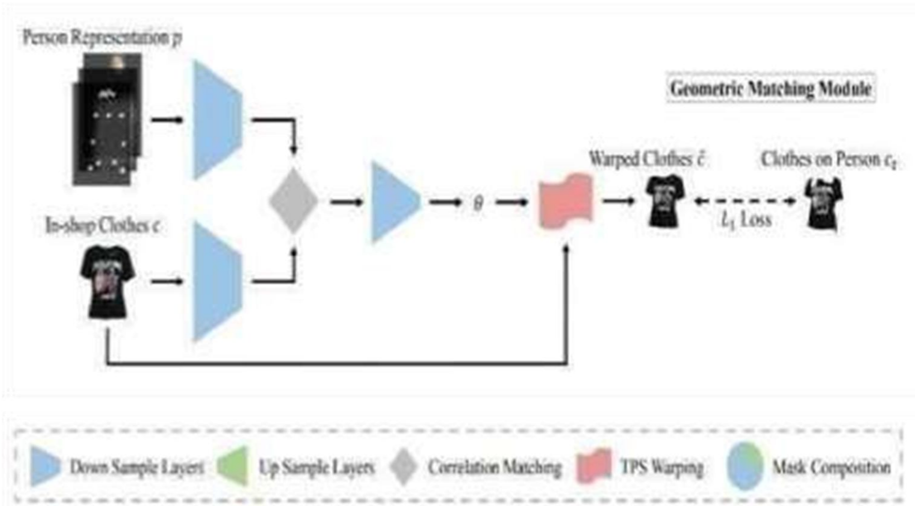

VII. CONCLUSION

The need to develop an algorithm that digitally dresses people in the chosen clothing is justified by the prevalence of online shopping and people's desire to take full use of it while purchasing clothing.Clients frequently have the need to spend hours physically trying on a variety of clothes when shopping for apparel. It's possible that the time available is insufficient, and this could be tiresome. The suggested solution for this problem is to use a virtual styling room that doubles as a trial room and uses live video feed.Using a Kinect sensor, the nodes and points of the human body are plotted, which provides information for precise fittings and time savings.Online shoppers would be quite grateful for the technology that would allow them to more easily check oneself out in various clothing.Our judgement was that the exercise actually saved time. It doesn't necessitate more work. Anyone can use this virtual machine, regardless of technical ability. It doesn't require a great deal of technical knowledge. As a result, it is available. It is therefore the ideal addition for a clothier. Overall, it looks like the proposed virtual dressing room is a good choice for accurate and quick virtual garment fitting.

FUTURE ENHANCEMENT

Right now, the application's only purpose is to let users try on virtual clothes. As intended, a new application created just for the owner or shopkeeper will be used. This programme will send the owner information every day about how many people tried stuff on, how many bought them, which clothes should be stored longer, etc. Additionally, we plan to incorporate a machine learning model into our application, which will give the user buying suggestions for clothing based on their past preferences for clothing and other variables.There are a few operations that must be completed to assure accuracy after identifying the target image's anatomical portions.
Therefore, we need to train three different types of networks in order to arrange clothing on the goal image.
Pose Alignment Network (PAN)
FTN (fitting network) and TRN (texture refinement network).

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