Try On: A Virtual Dressing Room

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Abstract- *With the introduction of computers and the internet, we can enjoy online shopping anytime, anywhere in the world. Online shopping has undoubtedly replaced the traditional way of shopping for everyday items and clothing. When we choose to shop online, we gain credibility. Today, almost all online stores offer cash on delivery, free shipping, and discounted prices. These online shopping stores make parking, traffic jams, and long lines to check-in superfluous. They also benefited those who repeatedly complain about lack of time. It is for this reason that most of the people have turned to online shopping. Here they enjoy easy access to an attractive price range, fast customer support and free home delivery. There is no doubt that these are some of the attractive features that are attracting the attention of consumers. While there is a small problem that can cause people to lose interest in shopping online, in such cases it may not be possible to try on clothes. Our motive here is to increase time efficiency and improve accessibility of trying on clothes by creating a changing virtual environment. Our proposed approach is based primarily on the detection and recognition of the human body and the joint positions of the human skeleton. User extraction allows us to create an augmented reality environment by isolating the user area from the video stream and overlaying it on the user interface of a virtual environment. We use human body movement tracking and clothing overlay on the upper human body. Finally, the garment is superimposed on the user in real time.*

Keywords- Augmented Reality,opencv,pose detection, superimpose, virtual try on.

I. INTRODUCTION

Trying clothes in clothing stores is usually a time consuming activity. Besides, it might not even be possible to try-on clothes in such cases as online shopping [1].Due to the rapid growth of technological development, our daily life is strongly influenced by intelligent systems that facilitate our activities. For example, online shopping grew very rapidly. People are getting more and more used to online shopping, online auctions, etc. to buy your interested products. This type of transaction has become the main trend and offers great convenience to customers. However, a problem with shopping for clothing online is that the customer cannot try the product until they have received that product. The feeling after wearing the influences the customer's decision to purchase the clothing. Therefore, there is a growing need to develop a virtual dressing room to simulate the display of dressing room.Our motivation here is to increase the time efficiency and improve the accessibility of clothes try on by creating a virtual dressing room environment. The problem is simply the alignment of the user and the cloth models with accurate position, scale, rotation and ordering.[2] First of all, detection of the user and the body parts is one of the main steps of the problem. In literature, several approaches are proposed for body part detection, skeletal tracking and posture estimation. The problems can be brilliantly managed by means of simple software like OpenCV and visual studio.

II. LITERATURESURVEY

The current method of online shopping does not guarantee the perfect size of the clothing. This results in a number of products being returned and the time taking to replace it with the correct sized one is long. This is a major setback for the online shopping industry.

The solution was launched by a mega-fashion brand TOPSHOP. User has to pose with their arms above their heads and allow for the Kinect to take a photo. User can use gestures select the clothes he/she wants to try. Once selected, the clothes selected by the user are pasted onto the picture taken before. Major drawback with this solution is that it works on just a single image and that too in specific pose. Virtual mirrors also known as virtual dressing rooms as mentioned above however not much work has been done on attempting the problem of color change and texture projection for shirts that we are after. One successful project is Virtual Mirror; this however was extremely heavy on the constraints it posed on the user who was using the system. The system required that a green shirt be worn and that there be texture on the shirt in the region where the texture had to be changed.

An avatar is used here instead of a real person. A large collection is available on digital library where the user can choose for their preference. Since an avatar is used it’s not very impressive.

III. METHODOLOGY

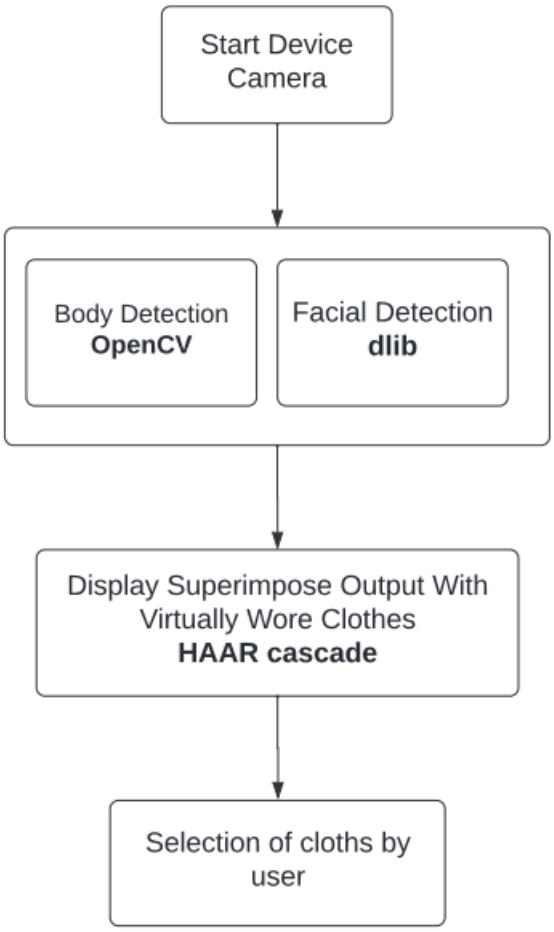

Fig 1: Block Diagram

As we study and understand drawbacks of all exiting models we choose augmented reality and for backend programming python language because its packages and libraries are supported by OpenCV and easy to install. We focus on python programming with version 3.6.8. We use flask framework, Tkinter, OpenCV, Dlib, haar cascade dataset. Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. It is a growing trend among companies involved in mobile computing and business applications in particular.

Amid the rise of data collection and analysis, one of augmented reality's primary goals is to highlight specific features of the physical world, increase understanding of those features, and derive smart and accessible insight that can be applied to real-world applications. Such big data can help inform companies' decision-making and gain insight into consumer spending habits, among others. Augmented reality continues to develop and become more pervasive among a wide range of applications. Since its conception, marketers and technology firms have had to battle the perception that augmented reality is little more than a marketing tool. However, there is evidence that consumers are beginning to derive tangible benefits from this functionality and expect it as part of their purchasing process.

For example, some early adopters in the retail sector have developed technologies that are designed to enhance the consumer shopping experience. By incorporating augmented reality into catalog apps, stores let consumers visualize how different products would look like in different environments. For furniture, shoppers point the camera at the appropriate room and the product appears in the foreground.

Elsewhere, augmented reality's benefits could extend to the healthcare sector, where it could play a much bigger role. One way would be through apps that enable users to see highly detailed, 3D images of different body systems when they hover their mobile device over a target image. For example, augmented reality could be a powerful learning tool for medical professionals throughout their training.

Some experts have long speculated that wearable devices could be a breakthrough for augmented reality. Whereas smartphones and tablets show a tiny portion of the user's landscape, smart eyewear, for example, may provide a more complete link between real and virtual realms if it develops enough to become mainstream. Flask is a small and lightweight Python web framework that provides useful tools and features that make creating web applications in Python easier. Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together.

Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed. Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python programs is easy: a bug or bad input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints

a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple approach very effective. It gives developers flexibility and is a more accessible framework for new developers since you can build a web application quickly using only a single Python file.

Tkinter is Python's de-facto standard GUI (Graphical User Interface) package. It is a thin object-oriented layer on top of Tcl/Tk. Tkinter is not the only GUI Programming toolkit for Python. Python provides the standard library Tkinter for creating the graphical user interface for desktop based applications. Developing desktop based applications with python Tkinter is not a complex task. An empty Tkinter top-level window can be created by using the following steps. Tkinter is a good choice because of the following reasons: Easy to learn. Use very little code to make a functional desktop application. Layereddesign. Portable across all operating systems including Windows, macOS, and Linux. Pre-installed with the standard Python library.OpenCV-Python is a library of Python bindings designed to solve computer vision problems. Python is a general purpose programming language started by Guido van Rossum that became very popular very quickly, mainly because of its simplicity and code readability. It enables the programmer to express ideas in fewer lines of code without reducing readability. Compared to languages like C/C++, Python is slower. That said, Python can be easily extended with C/C++, which allows us to write computationally intensive code in C/C++ and create Python wrappers that can be used as Python modules. This gives us two advantages: first, the code is as fast as the original C/C++ code (since it is the actual C++ code working in the background) and second, it is easier to code in Python than C/C++. OpenCV-Python is a Python wrapper for the original OpenCV C++ implementation. OpenCV-Python makes use of Numpy, which is a highly optimized library for numerical operations with a MATLAB-style syntax. All the OpenCV array structures are converted to and from Numpy arrays. This also makes it easier to integrate with other libraries that use Numpy such as SciPy and Matplotlib.Dlib is a landmark's facial detector with pre-trained models, the dlib is used to estimate the location of 68 coordinates (x, y) that map the facial points on a person's face like in the image below.

A sprite is a computer graphics term especially in animations and games frameworks. Sprites are objects, with different properties like height, width, color, etc., and methods like moving right, left, up and down, jump, etc. In this article, we are looking to create an object in which users can control that object and move it forward, backward, up, and down using arrow keys.Let first look at our first-class i.e., the class in which our sprite is defined, we will call that class Sprite.This Sprite class defines its positions (x and y coordinates), dimension of an object, color, etc. First, we will be calling our __init__() method. It is called a constructor for a class. A sprite has the following characteristics: A width and height – i.e. a rectangle.A graphical image in some form - the sprite might be a viewport onto a larger graphic. An optional position on a larger window Graphical frameworks such often also provide the following capabilities for sprites: Moving sprites around the screen so that old copies are removed from view – the sprite is managed as an independent graphical element. Collision detection between sprites - automatic identification between two sprites that are in contact or overlap. Optional state information against the sprite.

The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper “Rapid Object Detection using a Boosted Cascade of Simple Features” published in 2001. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them. The model created from this training is available at the OpenCV GitHub repository. Python, Matplotlib and OpenCV installed on your pc for haarcascade. Here we will work with face detection. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in below image are used. They are just like our convolutional kernel. Each feature is a single value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.

1. User Interface :

Fig 2: Home Page

Fig 2 screenshot shows the home page of the try on virtual dressing room consist of home, about us, contact.

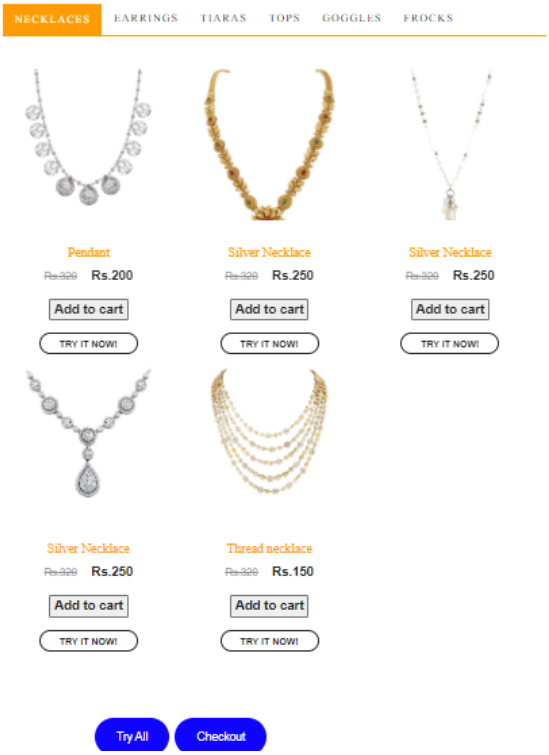

Fig 3: Collection of necklaces

Fig 3 screenshot shows the collection of necklaces which is available in try on virtual dressing room and add to cart is one option and try it now is another option.

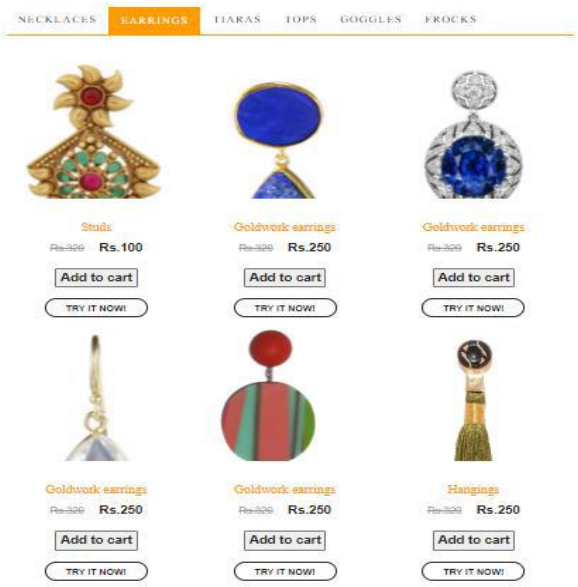

Fig 4: Collection of Earrings

Fig 4 screenshot shows collection of earrings which is available in try on virtual dressing room and add to cart is one option and try it now is another option. The try all and checkout option is for add to cart products to check again.

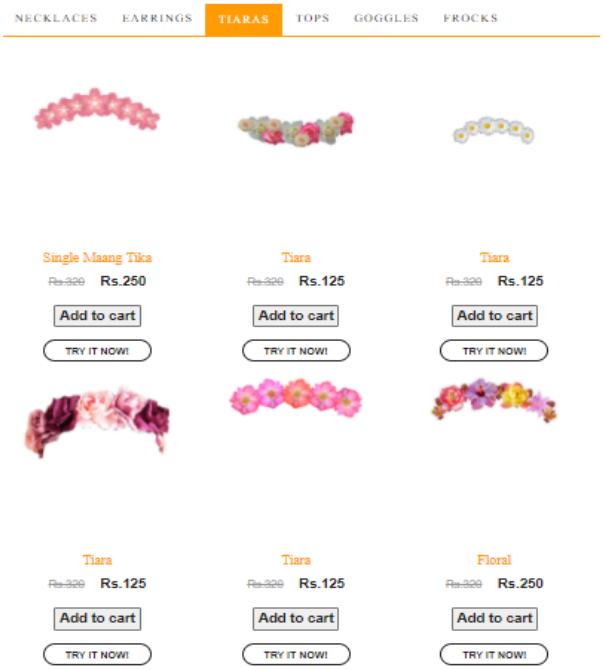

Fig 5: Collection of Tiaras

Fig 5 screenshot shows collection of earrings which is available in try on virtual dressing room and add to cart is one option and try it now is another option.

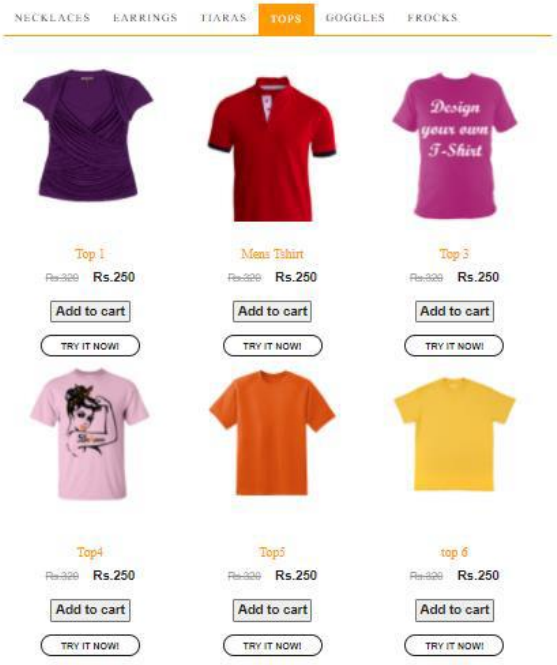

Fig 6: Collection of Tops

Fig 6screenshot shows collection of tops which is available in try on virtual dressing room and add to cart is one option and try it now is another option.

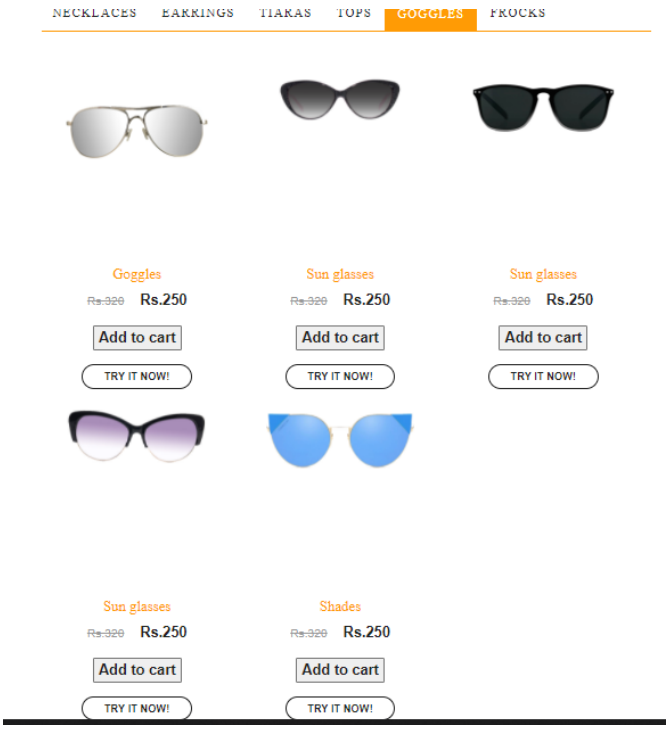

Fig 7:Collection of Goggles

Fig 7 screenshot shows collection of goggles which is available in try on virtual dressing room and add to cart is one option and try it now is another option.

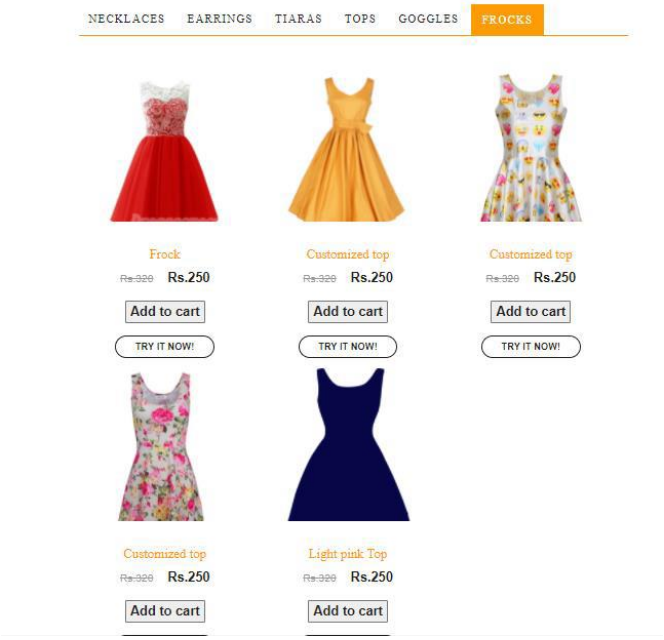

Fig 8: Collection of frocks

Fig 8 screenshot shows collection of frocks which is available in try on virtual dressing room and add to cart is one option and try it now is another option.

2. User Interface:

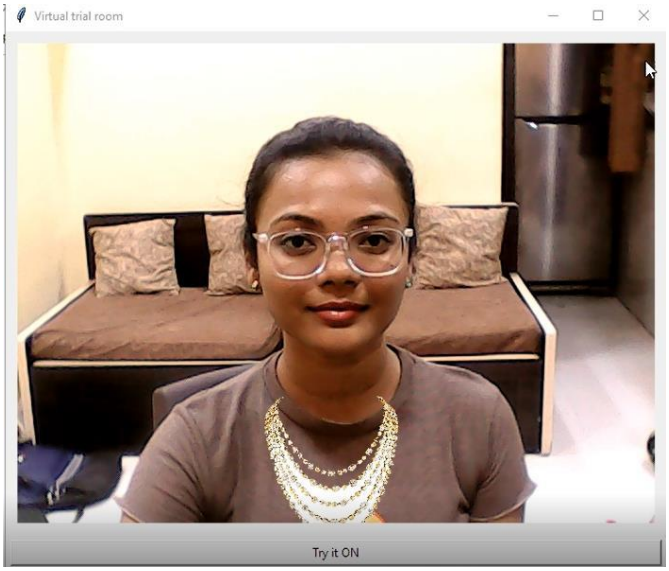

Fig 9: Shows the output of necklaces

Fig 9screenshot shows the user uses try it on option for necklaces.

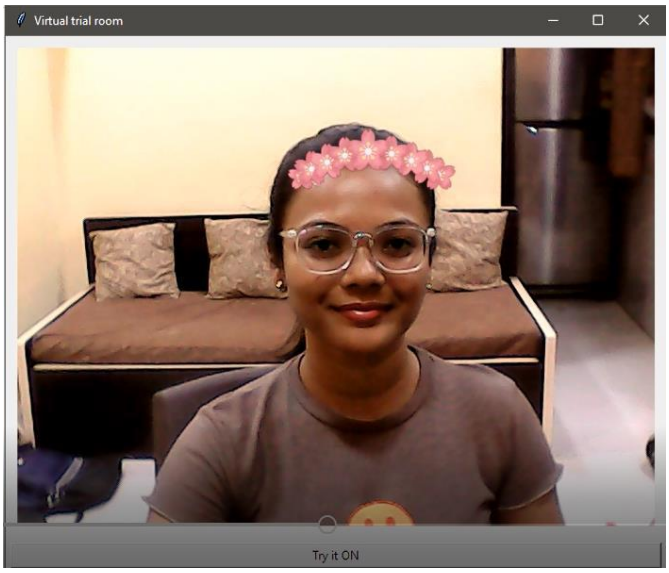

Fig 10: Shows the output of tiara

Fig 10screenshot shows the user uses try it on option for tiaras.

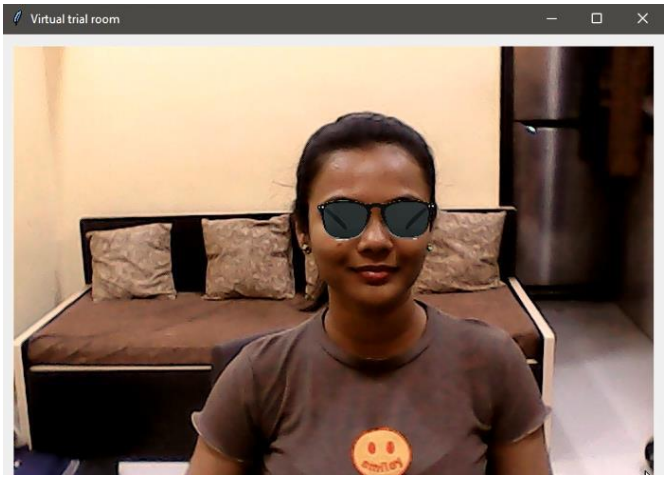

Fig 11: Shows the output of goggles

Fig 11screenshot shows the user uses try it on option for goggles.

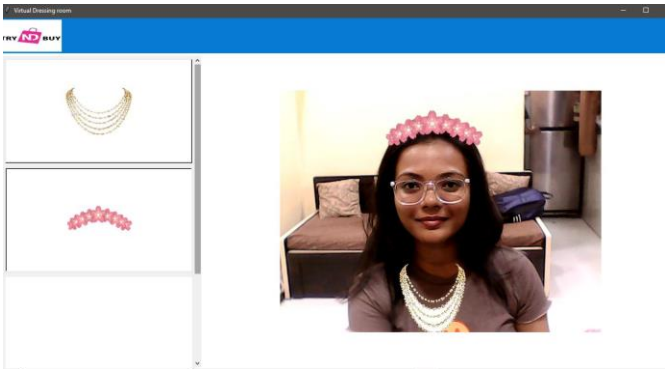

Fig 12: Shows try all feature

Fig12screenshot shows customer can try all selected products

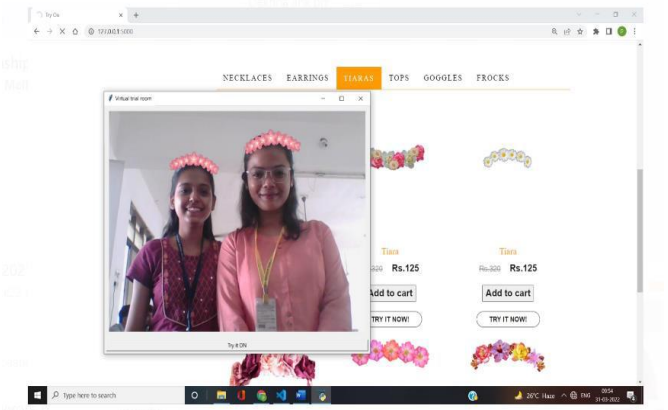

Fig 13: Tiaras Try On

Fig 13screenshot shows users can try the multiple element/products at a time.

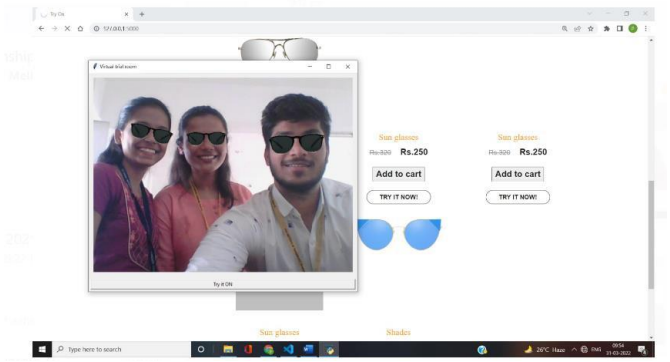

Fig 14: Multiple user try on

Fig 14 screenshot shows users can try the multiple element/products at a time.

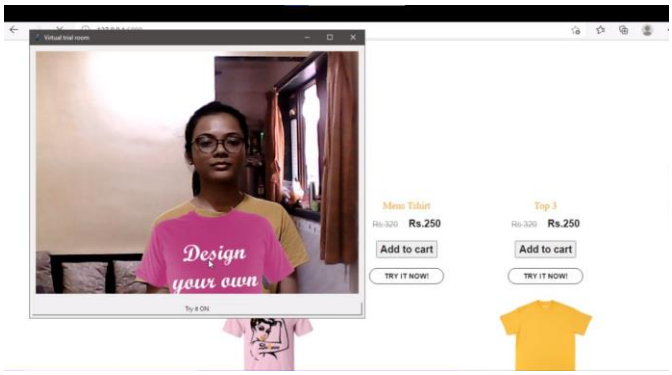

Fig 15:T-Shirt try on

Fig 15 screenshot shows user has worn T-shirt virtually.

IV. CONCLUSION

Fashion has become an important aspect in the life of modern youth. Fashion can vary by country, region, culture, age, season, climate, purpose, environment, interests, personal, etc.With the use of augmented reality, limitations of online shopping of clothes can be overcome easily to allow users to virtually wear any outfit which will help e-commerce websites to advance their technology and gain the trust of customers. The aforementioned papers cover the overall aspect of application development and supporting techniques and tools used for development including human body tracking and the subsequent superimposition of the garment over the body using AR. Virtual Dressing room is an augmented reality dressing room where the image of the user is captured by the webcam and given as an input.By using the face and body detection techniques, the video is scanned for the presence of human faces and product images are then masked. Now the masked image is superimposed and the user can see the images of the dresses and face accessories on self. This enhances & increases the experience and support for

augmented reality.We finally demonstrated a prototype to test our researched techniques and technologies for creating a virtual cloth-fitting application using AR to superimpose and overlay a 3D model version of the user's selected article of clothing onto the real-time footage of the user via the camera of their device.The presented application is an improvement over similar existing augmented reality applications in that it offers the same functionality without any specialized hardware requirement. The tasks carried out in this semester were project implementation and software testing. Currently we have built an application for only windows OS.

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