

# Virtual Trial Room

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**Abstract:** Augmented Reality is a viewer of various components in both direct and in an indirect approach., providing an interactive real-world experience, which includes auditory, visual, olfactory, haptic etc. Augmented Reality can be used to reduce hassles while online shopping. The objective of this paper is to develop a virtual trial room application using AR Unity which allows the user to try on various using augmented reality AR technology, which also reduces the time and the chaos created while purchasing garments online.

**Keywords:** virtual dressing room, virtual reality, unity, virtual trial room

## I. INTRODUCTION

In the past year, online shopping of clothes has increased drastically. Due to the ongoing pandemic, all the e-commerce sites are taking various steps to make their product more convenient to their users. One of the major issues faced while shopping for clothes online is the inability to try them on. This will set us back from buying them. Some have the fear of experimenting a new fashion, to try out different colors. They won't get a feeling of satisfaction just by the photos of the cloths, physically trying them on will give the customers confidence and a sense of what style they are getting into. Due to these reasons, they avoid shopping online.

Virtual Trial Room gives the customer the ease of trying out clothes from home. It provides greater level of satisfaction to the customer, in getting an idea on how the garment looks on him/her without physically trying them out. It gives them an option to experiment with fashion Reduces the hassle with try on at home, returns and refunds. The user should click a picture of themselves (full body) or choose a picture from gallery and select the garment that they wish to try on and a 3D model of the selected garment will be shown on the picture. The user can adjust the garment on the body photo. and they will receive a virtual look of themselves wearing the garment.

## II. PROBLEM STATEMENT

Online shopping has become the go to, thanks to the continued pandemic but the e-shopping websites aren't getting the expected sales and have encored loses because of many reasons.

Apparel sizing may be a broken system. Despite many efforts in trying to standardize it, sizes across countries, brands, or maybe within an equivalent brand have inconsistency. The trouble of finding the right size remains a significant issue while purchasing clothing online. Sizes vary from one site to another, they even vary between different brands and since we do not have an option to try the products before buying them, selecting the dimensions, and trying out new fashion is usually a big gamble.

Also, the fear of experimenting with new fashion or new style without knowing if it suits your personality and fits your somatotype may be a problem. The sizing chart varies from one sort of clothing to the opposite and hence customers are reluctant to shop for it before trying and checking the fit of the clothing

Customers don't feel greater level of satisfaction while buying a garment without physically trying and see how the garment looks on him/her. Hence many purchasers buy new clothing from a replacement brand or a replacement style and check them and if they're not satisfied return them back which have incurred losses to the brands. Small and new brands have had successful because of this crisis as people preferred to shop for clothing from the brands they have already got and are conversant in the fit it provides.

There are many works that are in the process. An idea of a virtual mirror was designed through which we can have a glance on how various shoes would look when we wear them. Capturing the feet and replacing the selected shoe with a virtual 3D model of the shoe. Another example is a system that's helps the user to try on eyeglasses, example Lenskart, they provide a virtual try-on of eyeglasses, superimposing glasses on a picture of the face after certain features of the face like nose as a mid-point, were detected.



Fig1: Reasons for not opting for online clothing options

### III. APPROACH

In the proposed system, we'll describe an easy and efficient Trial Room with virtual usage. This application helps the user to see his/her own attire without wearing it. Initially the user must face the camera which focuses the user image and fit various costumes thereto and displays. This basically helps the user to understand his/her choice easily and supply greater level of satisfaction. We are using Unity Software to develop The Virtual Dressing room application. Unity3D is a software which is a high-level cross-platform 3D engine and provides different platforms, both virtual and augmented.

### IV. RELATED WORK

Various ongoing systems have many perceptions within the area of Augmented Reality which have made the idea of Virtual Trial Room possible. Snapchat is one of the major apps which makes use of virtual reality. Many companies have developed applications supported computer game. One among those ideas is that of the Virtual Trial Room which is a much essential application in today's time as the number of online garment purchases are increasing every day A few years back, several technologies came up with various ideas for implementing virtual dressing rooms by using webcams, depth sensors and camera arrays.

In these methods the user should stand before a blue screen and the image-based systems with the algorithms would overlay the clothes on the user.

### V. TECHNOLOGIES

Unity 3d Engine will be used for building the Android app. Unity is a virtual and an augmented engine which has graphics software, used for many games and virtual reality applications. It is available for Windows and Mac OS and on many mobiles. So, the Virtual room can be executed on all different operating systems. It is a free engine, but the premium version has many high features.

Using Vuforia sdk for Built-in AR support and for incorporating Augmented reality into our app.

Vuforia allows creation of many AR applications, and it is a augmented reality software development kit.

For 3Dclothing models, models from blender in .obj or .fbx format will be used.

Blender is an open - source and a free software which is used to add special effects and computer graphics providing a visual effect for 2D as well as 3D models, it also includes many interactive models, motion graphics which makes models of the virtual world easy to design.

Various android plugins for accessing the phone for camera, storage and other features.

Scripting our files using C#.

When we came across many of the solution that are available, but they were not feasible due to the following reasons. Human body tracking and using the models on them over live tracking is not possible due to the following reasons -

ARcore or Vuforia doesn't have a human body tracking feature and to develop one to do the same will not be feasible because Unity's AR core or Vuforia will not be supported on it OpenCV - Many of the solutions that we saw included openCV , but the Open CV versions were not compatible with unity hence we had to use the OpenCV compatible with unity from the asset store which were paid assets

Microsoft kinect - This was another possible way of solution for our problem, but we would need the kinect device to access the camera and the kinect2.0 software would not help us track the human body without the kinect camera

AR foundations - One more possible way of tracking human body was using AR foundation from ARkit but AR kit was made available only for mac OS and the latter has many features included which cannot be used on android.

## VI. IMPLEMENTATION

“Virtual Dressing Room” is implemented with Unity 3D along with Vuforia and Blender, which is used to created 3D models of garments.

The UI/UX of the application is done using Unity Scene.

The camera scripting code is written in C#.

Unity has built in primary scripting API in C#.

So, the integration of the camera is easier in unity.

## VII. DESIGN

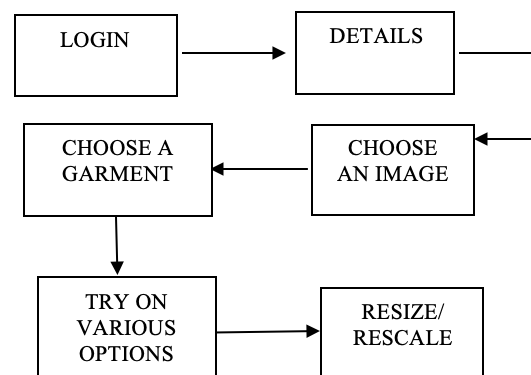
The goal of our project is to introduce a virtual trial room that allows the user to have a glance at several pieces of garments while shopping online, thus giving us the in-store feel.

The important component of the virtual dressing room is a 3-D model of the clothes. The 3-D models should be similar in colour and texture of the real cloth so the user get an image of what they would look when they are worn. Another important aspect is to make the models as realistic as possible. This is a major difficulty in virtual reality.

Garments:To make the model more realistic, Cinema 4D can be used, which is a long process.

User Interface:

The application has a basic user interface. The user will be asked to provide a few details and will be asked to select a garment. The user should choose a full body image for the trial of the garment. The selected garment's 3D model will be processed and will appear virtually on the screen, on the image selected. The user can then adjust the model zooming in/out, moving it and relocating the position to fit the body. This will provide the user with a basic idea of how the garment looks on them and thus giving them an idea about purchasing the product.



Size Issues:

Size is the biggest complication when it comes online shopping of garments. Using Kinect is quite popular. The body measurements are calculated, and the body gestures are followed. The body measurements can also be calculated without Kinect. With the distance between the camera and the user, the height can be calculated and with the co-ordinates of the shoulders the size can be estimated roughly. Many phones, iPhone 12, have the features of estimating the height of the person by using depth area analysis, these features in a device would be useful for many applications and would be a great advantage to the e-commerce sites.

**VIII. FUTURE IDEAS**

As discussed in the previous section, tackling size issue has many pros and it would a great booster for online garment sites. Providing the user an approximate size that would be suitable for them will remove a major disadvantage in purchasing the garments online.

Using co-ordinates to determine the size is one of the methods to tackle the size issue. Co-ordinates can be used in identifying different joints in the body. Once all the co-ordinates are set up, the distance between them can be calculated. This along with the height of the person can be used to calculate the approximate size.

**IX. CONCLUSION**

In this paper, we have discussed the problems faced by the users while purchasing garments online. Our motivation is to provide an application which would help the users while purchasing. Since try-on aren't possible while buying online, having a virtual look at how the garment would look on the user is a better alternative. This will be a great advantage to the e-commerce websites and would also enhance the user experience.

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