iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3 **Issue:** XI **Month of publication:** November 2015

DOI:

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Suggestion Based Outfit Selection Using Skin Tone Detection in Augmented Reality

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***Abstract:** In today's world, Fashion and Style is the way to say 'who you are' without having to speak. In Order to be irreplaceable one must look different. Outfit selection using Augmented Reality allows user to choose clothes virtually. It is application software simulates an apparel dressing room by the implementation of a virtual mirror, portraying an augmented view of the user with virtual superimposed clothes. This Application of trying clothes virtually is one of the most efficient process now a day. Commercially later we will keep the cost as low as possible.*
"Virtual Dressing Environment" involves virtually trying out different cloth models which is done by mining of the user image, alignment of cloths.
***Keyword:** 2D image, Augmented Reality, RGB, Virtual Reality, Sensors*

I. INTRODUCTION

A Suggestion based outfit selection is also often referred to as virtual fitting room or virtual trail room or virtual dressing room although they do, on Examination, perform different functions which makes this application work are per the requirement. It enables shoppers to try on clothes to check one or more of size, fit or style, but virtually rather than physically, this is done using Augment Reality.

Augmented reality is a type of virtual reality that aims to duplicate the world's environment in a computer. An augmented reality system generates a composite view for the user that is the combination of the real scene viewed by the user and a virtual scene generated by the computer that augments the scene with additional information. The goal of Augmented Reality is to create a system in which the user cannot tell the difference between the real world and the virtual augmentation of it. Today Augmented Reality is used in entertainment, military training, engineering design, robotics, manufacturing and other industries.

Due to the growing interest in Augmented Reality, the idea of virtual clothes is not new [5], [6].

Our working field of the project is basically image processing and augmented reality is merely a part of image processing. Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too. This technology has begun to emerge from 2005, fit technologies started to be widely reported from 2010, but are now available from an increasing variety of providers and are in use by a growing number of prominent retailers in their web stores.

The set of steps to be followed to achieve the goal are different according as per the requirement, some of the approaches are as follows: Initially starting with the Face Detection which has done with different methods such as HAAR classifiers [1], [4] and Alignment with the user's position [2]- which is User Tracking. Mapping of Out Fit on Body is done Using Body Parameter Recognition [3].

II. RELATED WORK

Literature survey carried out shows that there are various techniques to implement virtual trial room.

Some of them were studied and are explained below:

A. Using Kinetic Sensors

Virtual trial room can be implemented using the Microsoft Kinetic Sensors. We use the Kinect sensor to pose the user's pose

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tracking and depth sensing.

Ms.Shreya, Mr.Neel and Ms.Kriti [2] have proposed a model for virtual trial room using Kinect sensors bundled with RGB sensor for skeletal tracking of the user.

The use of kinetic sensor makes it relatively easy in getting access to the depth sensors. The depth sensors make use of markers and ShapeID to store and measure the size of user. The user will stand in front of the Kinect sensor, which has an RGB sensor and a depth sensor. When the user calibrates himself to the Kinect sensor, his size is estimated. This information is used to achieve a better fit of the virtual clothing. The OpenNI framework which acts as a middleware for the Kinect sensor is used which tracks the gestures of the user. Along with this a Unity 3-D gaming engine with Physx drivers is used which applies physics properties to the rendered garments.

A VTR engine is used to track the movements of the user and the rendering of the garments on user as per their movements.

B. Extraction Of User Based On Face Detection

Different approaches that are available for face detection are:

1) *Finding Faces By Colour*: Provided that colour images are used for face detection, the typical skin colour to find face segments might be used. The main disadvantage here is it is not very robust as under varying lighting conditions and doesn't work with all kind of skin colours
2) *Finding Faces By Motion*:

If a real-time video is used, the reality is that a face is almost always moving. The face can be easily detected by calculating the moving area. The main disadvantage here could be the moving objects in the background

C. Using HAAR Classifiers

Haar-like features are digital image features which are used in object detection. In this technique, rather than using the intensity values of a pixel, Haar-like features use the change in contrast values between adjacent rectangular groups of pixels, then the contrast variances between the pixel groups are used to determine relative light and dark areas in the image.[1].

The middleware used here is OpenCV (Open Computer Vision)

Open Computer Vision is an open source software that has C,C++,Python, Java interfaces which supports Windows, Linux, Android platforms. It is for efficient computation and uses multicore processing.

OpenCV comes with a trainer as well as detector. It can be trained with your own classifier for any objects like cars, chair etc.

Recurring cost and disadvantages

The technology used above [2][1]for implementing the virtual trial room proves to be costly
The Microsoft Kinetic Sensors[2] cost ranges from around 15000-25000 INR
The 3-D implementation of the virtual trial room requires multiple cameras to be used to track the user's body as per the movement.
The lighting conditions arise as a major factor in the face recognition process the user.

III. CONCLUSION

As we already know that online shopping is a tedious task, because of the related disadvantages of size and clothing material. This survey paper considers number of different approaches that can be implemented in order to overcome certain disadvantages of both online and real time shopping. From this survey, we cannot specify which approach is best suited to be implemented for the solutions to the respective problems related to virtual trial rooms. As all the techniques which are implemented have their fair share of limitations, due to which no one approach can be implemented on a universal level. Limiting the operational and recurring cost can be suggested as the choice that can be used for the most appropriate result.

IV. FUTURE WORK

Various problems still remain with Virtual Trial Room being fully functional and available to the users, also providing the best results. In future, it is essential to incorporate various enhancements in the existing system. One of the major problem, while trying clothes using virtual trial room is that as the user moves in front of the camera the cloth adjustment is compromised and user then

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has to adjust himself according to the position of the garment. This needs to be addressed thus providing user a real time experience. Also, we have a problem where the user doesn't know which color will exactly suit him/her. This problem is critical as after buying a certain garment you don't get the color that really suits on you, this issue can be solved by suggesting colors to the user that suits their skin color.

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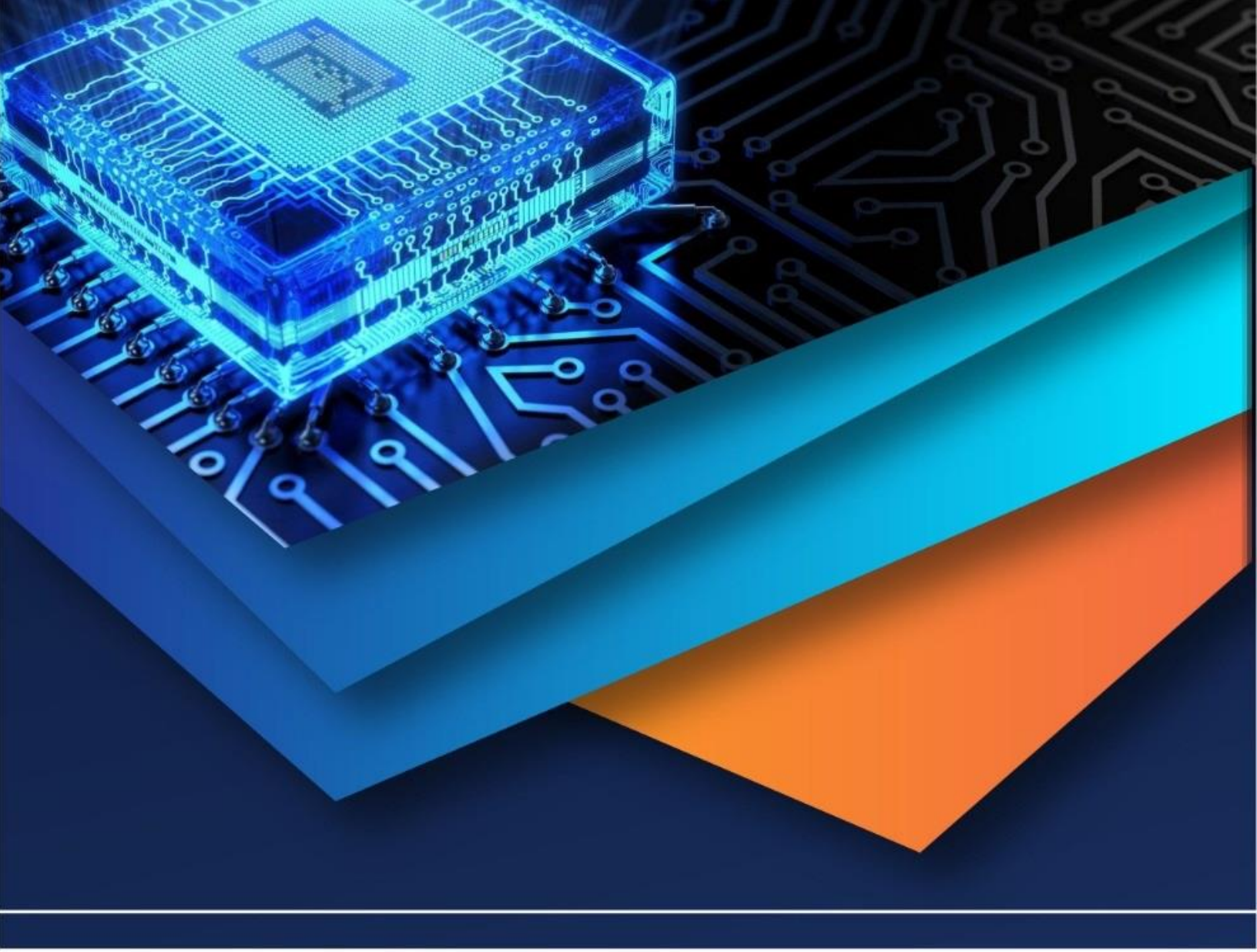

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