

# Implementation of Virtual Trial Room Using Augmented Reality

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**Abstract**—For most people, the first thing that comes to mind when they shop in a business. Even though buyers can try on clothing in real time, when there aren't enough trial rooms the procedure takes too long. The Virtual Mirror project has the potential to transform how people try on clothing and choose their next purchase. Customer can try on a wide range of items using the idea of "Virtual Reality" without having to physically wear them. A variety of research groups have applied the idea of a virtual trial room in different ways. One of the approaches involves the use of humanoid models to simulate the movements of the user and enables users to try the clothes on the model. Another approach uses a fixed static model of the clothing which is displayed on the screen and the user must position themselves according to the placement of cloth. The Kinect Sensor, which detects the human body and uses the information to superimpose the images, is used by the "Virtual Mirror" to create a real-time virtual trial room system. Prior to employing the Kinect Sensor, the system takes a picture. The user skeletal data is the data that is generated and supplied to Unity. This skeletal data is then used in Unity to generate the clothes and impose it on the user. A livestreaming video of the user with the clothes imposed is then displayed as the output on the screen. The advantage of using this method would be the reduction of time and effort spent in trying out the clothes physically. The customers can then buy the clothes by scanning the QR code provided on the screen. This project helps in Market Management so that a customer need not try each and every clothes. Also, Retailers need not have a huge stock in the store thus saving time and space. The advantage of using this method would be the reduction of time and effort spent in trying out the clothes physically. The customers can then buy the clothes by scanning the QR code provided on the screen. This paper helps in Market Management so that a customer need not try each and every clothes. Also, Retailers need not have a huge stock in the store thus saving time and space.

**Keywords**—OpenCV, Python, Virtual Mirror, Kinect Sensor, Humanoid model.

## I. INTRODUCTION

Many customers are having issues while during the trial of the new clothes at clothing stores this is a time-consuming process, especially during peak weekend days. In some other option to purchase the garments, such as internet shopping, it may not even be possible to try the garments. Nowadays, e-marketer business and e-commerce platforms have become one of the key factors influencing how people choose to spend their money and how companies conduct business [1]. Every year, the e-commerce industry expands. The number of clothing that can be worn during a trial at one time is limited for security reasons. Clothing as a product category for online buying also has the advantages of a vast assortment, ease of comparison, quickness of changing offers, and purchasing convenience. We want to use python to create an intelligent or smart trial room to address these issues. For implementing the proposed system i.e., smart trial room, open CV [6] is used. Since it is much faster and more pre-trained to detect the body, we will superimpose the fabric to save time and provide an outstanding user experience. Platform agnostic, meaning it may function on any operating system as long as the device has a camera, an internet connection, and a web browser. Open CV is an abbreviated form of open-source computer vision library that is compatible with python interfaces. How individuals use their finances. It is primarily intended to improve computing efficiency while also emphasising real-time applications. Multi-core processing is an added benefit of this package. Image processing library is included with a focus on real-time computer vision and applications in various domains such as both two and three dimensions feature toolkits, facial and gesture recognition, and more.

### 1.1 Kinect sensor

Microsoft created the Kinect range of motion-sensing input devices. Kinect has resolution of up to 1280x1024, The monochromatic, VGA-resolution dept-sensing video stream with 11-bit depth. This sensor will give video frames as input to system for finding the available dresses in database.



Figure 1.1 Kinect Sensor

### 1.2 Processing

Processing is an incredibly powerful and versatile programming environment and language. All Processing code is translated to java code first. This implies that you can use the processing IDE or not to write Java code and import Java libraries into your processing code

### LCD Monitor

A computer monitor or displays that employs liquid crystal (LCD) technology to show mostly present in flat monitors and laptop PCs, provides crisp visuals.

### OPEN CV:

OpenCV's goals [6] is to establish a user-friendly computer vision infrastructure that allows people to quickly develop quite complicated vision applications. The Open CV library has about 500 functions spread across a broad variety of vision-related topics including robotics, camera calibration, stereo vision, user interface, medical imaging, factory product inspection, and security. Because machine learning and computer vision are commonly connected, OpenCV contains a Library of MLL [7]. Statistical pattern detection and clustering are the focus of this area of the library. The MLL can be used to solve any machine learning problems, but it excels at addressing the vision-related issues at the core of OpenCV purpose.

The OpenCV open source licence has been designed so that we can use OpenCV to make a commercial product. We are not obligated to open source your product or return changes to the public domain, though we hope you will. Because of the generous licencing terms, a large user community includes personnel from major corporations like IBM, Intel, Google, SONY, Siemens, and Microsoft, and research institutions such as Stanford, INRIA, Cambridge, MIT and CMU. Since the alpha version was released in 1999, it has been used in various Utilization like an image stitching, object analysis, medical image noise reduction, automatic monitoring and safety systems, and security and intrusion detection systems.

#### A. IMAGE PROCESSING:

It [8-9] converts an image representation and then conducts operations on it to extract valuable information. All images are typically treated as 2D signals by the image processing system when certain signal processing algorithms are used. The picture manipulation can be divided into five categories: 1) Visualization -Locate objects in the picture that are not visible. 2) Recognition - Distinguish or detect objects in the image Sharpening and restoration - Create an enhanced image from the original image. 3) Pattern recognition - Measure the various patterns around the objects in the image. 4) Retrieval - Browse and search images from a large corpus of images similar to the original. According to the application, image processing tasks can be classified into several parts, as given in the following subsections.

### Architectural Diagram

The design process of identifying subsystems and establishing the framework for a subsystem control and communication is called architectural design. It is a creative process where one tries to create a system organization that will fulfil the system's functional and non-functional criteria. It represents the structure of data and program components. It represents a set of abstraction that enable software engineers to describe architecture in predictable ways. The product of the architectural design process is an architectural design document which includes graphical representations of the system along with associated descriptive text.

The architectural design process is concerned with the establishment of a structural framework. It defines the major components of a system and communication between those components. gives an architectural overview of the project.

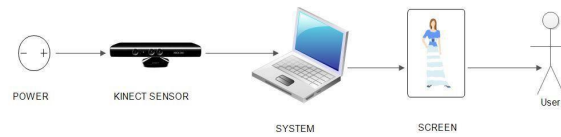


Fig 2: Basic Architectural Diagram of Virtual Mirror

## II. LITERATURE SURVEY

In [1], Kinect sensors-based a virtual changing room application was created and utilized to align, identify skin tone, and remove the user from a video. With the aim of aligning the two-dimensional cloth models and user, the three dimension positioning, rotating and scaling. In [2], the authors reported information about software systems and image corpus. These images corpora include a basic representation of the human body as well as photographs of numerous articles of clothing. Their software permits the customer to independently choose and attempt an image of the garment according to age variation. The system provides pictures of the customer's the body/model in the arguments, using precise body measurements in terms of height, bulges and curves. In [3], the researcher reported an application of mobile which facilitates online customers to distinguish how garments will appear on them before buying them. The shopper installs the APP on their mobile, and then he will get a group of queries about their body like size, shape and skin tone. Once such information is entered, the APP directs the customer to the clothes that fit the body. In [4], a newly augmented concept is included for wearing the clothes. It permits the purchasers to join easier and simulate a tactile experience of the materials. The dressing room has a camera that takes pictures and also manages the projection surface instead of a mirror. The clients set visual labels on their garments. Then, the AR DressCode APP captures the features and give suggestion regarding the offers of an selected cloths are blended in and suited to the client's body in an augmented reality video stream on an AR mirror. In [5], an item of clothing for modelling by using standard measurements was reported. Two-dimension patterns of cloth are created with assistance from splines, and then appear around the human body virtually to give the early size. Implementation was prepared by applying natural fabric properties to acquire the 2nd item of clothing. And after making this, the browser was created in the realtime platform using the internet.

## III. METHODOLOGY

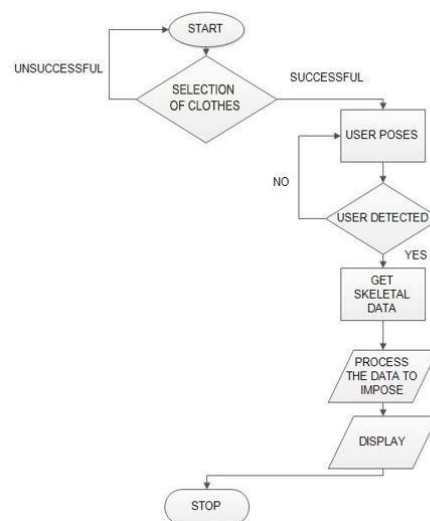
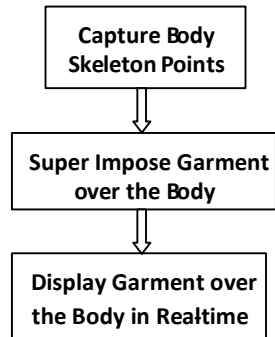


Fig.3.Control flow diagram for virtual mirror

### TRYING ON THE GARMENTS

- The user captures skeleton joints successfully.
- The system resizes the garments as stated by the user's body and superimposes them over the body in their respective positions.
- The system finally displays the garments in real-time..
- Core: It describes the essential data structures, such as the dense multi-dimensional array Mat and the functions that all other modules utilize.

- **Imgproc:** This part does the process on the image through linear and non-linear filtering, geo-metrical image transformations, histograms etc.
- **Video:** This unit is used for motion estimation, object tracking and background subtraction.
- **Calib3d:** A fundamental multi-view geometry techniques, single and stereo camera calibration, object pose evaluation, stereo correspondence methods, and 3D reconstruction elements
- **Features2d:** Descriptor matches the salient feature detectors.



Trying Cloths on Garments

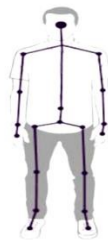


Fig.6.Try on skeleton joints

2) NUMPY

It is a Python package (It is a high-level, object-oriented, interpreted, dynamic and multipurpose programming language). At present, python is an easy-to-learn yet powerful and versatile scripting language, which makes it attractive for Application Development. It stands for "Numerical Python". It is utilized for the calculation of numerical values.

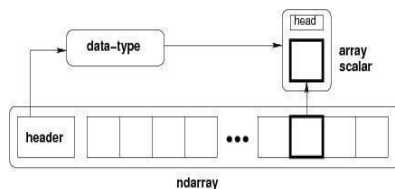


Fig.7: ND Array

The majority important in NumPy is the ndarray type of N dimensional array. It refers to a group of goods that are all of the same type. A zero-based index can be used to find items in the collection. Every item in an ND array occupies the same memory block size. Each entry in ndarray is a data-type object.

This provides us the URL of the website for choosing an outfits. The website is developed using HTML and XML. It consists of shirts, that the user wanted to try on. To enhance comprehension we have different interfaces for shirts and pants. We can select the shirt and pant to try on and then it opens a web camera. The user will be standing in front of web camera and the clothes are resized according to the user’s body. Finally the respective clothes are super imposed over the body.

From the given user interface we can select our shirts and pants that we want to try on and then click on “try” to find the individual person and super imposes the garment on to the user’s body, Snapshot of smart trail room with T-shirt and  $\frac{3}{4}$  shorts, and Snapshot of smart trail room with T-shirt and full-Pant, respectively. It has been noted that the actually garments which is put on the body by user is covered by the virtually created garments by the developed system. After, the whole executions click on ctrl+ c to exit the debugging.

### CONCLUSION

A common problem faced by customers while shopping for clothes is the need to spend hours trying out a range of clothes physically. This might be tiring and the time available might be short. The proposed solution to overcome this problem is using a Virtual Mirror that acts as a virtual trial room. It plots using a Kinect sensor nodes Connecting points of the human body, and using this information garments are rendered over the user’s body, doing away with the need for actual cloths fittings. Hence assisting with time savings.

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