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Virtual Dressing Room

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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 consider going shopping. Despite the fact that shoppers can try on clothes in-store, there aren't enough trial rooms, so the procedure takes too long. In order to enable users or consumers to choose from a wide range of clothing designs before replicating those clothes on virtual humans, our team is working to develop an interesting, dynamic, and amazingly realistic virtual system. In this study, we have proposed a technique that helps with daily attire synchronization. The initiative to create a virtual dressing room with a live camera stream may change how someone shopping for and dresses themselves. Customers can try on a variety of items without actually wearing them by utilizing "Virtual Reality." 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.

***Keywords*—Rasberry pi, image processing, Virtual dressing room, mirror.**

I. INTRODUCTION

The two universes are the physical world and the digital world. When people first learned about computers, they started using digital technology. He has been working to seamlessly merge the virtual and digital worlds. Numerous technologies have been developed in an effort to close many innovations are introduced to reduce the space in the middle of physical and digital cordis Augmented reality and virtual reality are all types of software that connect the digital and physical worlds. Numerous tools that enable users to interact with both the real and virtual worlds were created as a result of this. The fast-paced growth of the technology development business has had a considerable impact on the smart technologies that expedite our daily operations. For instance, online shopping evolved swiftly. The use of online stores, auction sites, etc. to purchase items of interest is becoming more commonplace. This style of transaction is now the most common and provides clients with a tone of convenience. Customers cannot try on clothing before buying it, which is a disadvantage of online apparel shopping. How a client feels after dressing affects their choice to buy the products. Virtual dressing rooms that can replicate the visual component of dressing are thus becoming more and more necessary. Trying things on in a store typically takes a long time. Additionally, it is not possible for an individual to try out each and every cloth when they are shopping online. We intend to increase accessibility and speed up the fitting process by creating a virtual changing room setting. The only problem is the precise alignment of the cloth models with the user in terms of placement, Scale, ordering and rotation. Identifying the customer and their physical components is going to be the first step in solving the issues. Article has put forward a number of techniques for body component detection and posture assessment. Thanks to the usage of web cameras, online shoppers are better able to control prices. As a result, our virtual trial room software may substantially alter the way people shop today. People don't need to be concerned about covert cameras or spend hours in line in front of the trial chamber to examine their clothing. People can rapidly change into new clothes or try on gowns because using this simply takes a few seconds. In this case, the user saves a lot of time and effort.

II. LITERATURE SURVEY

[1]. Implementation of Virtual Fitting Room Using Image Processing by Srinivasan K. Vivek S. Department of Electronics and Instrumentation Engineering, Sri Ramakrishna Engineering College Coimbatore, India.

When dressing a person online, the Virtual Dressing Room technique calls for separating the subject from the setting as little as possible while accounting for changes in illumination. The upper and lower body contours are then detected using a Laplacian filter, followed by edge detection. Then, feature points based on the fundamental human anatomy are retrieved. These places are used as a reference to precisely bend the sample shirt to fit the wearer.

[2]. By Cecilia Garcia, Nicolas Bessou, Anne Chadoeuf, and Erdal Oruklu, Department of Electrical and Computer Engineering Illinois, Institute of Technology Chicago, Illinois, USA. Image Processing Design Flow for Virtual Fitting Room Applications utilised in Mobile Devices.

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With the help of this effort, a mobile application for a virtual changing room was successfully constructed. The primary goal of creating a real-time, platform-neutral application was achieved. Sizing options range from XS to XL, and users can move the apparel around with the arrow buttons and, if necessary, adjust its width with the scroll button. Before taking a photo of oneself to demonstrate how the outfit fits, they may also want to experiment with various items. The programme may monitor the user's position and movement while tracking and sizing the apparel. When this software is published visit the Apple Store or the Android Market, retail establishments can utilise it.

[3].Pose estimation and homograph are used in a virtual trial room by Kshitij Shah, Mridul Pandey, Sharvesh Patki, and Radha Shankarmani. Sardar Patel Institute of Technology in Mumbai, India, Information Technology Department. The shopping experience would be substantially enhanced by the creation of a mobile application that enables consumers to virtually try on clothing using open CV and TensorFlow lite technologies.

Al proposed a remedy that would align the input fabric with the person's likeness using a Geometric Matching Module.The consumer then virtually attempts the garment on using the smartphone app. OpenCV is used to map the apparel on to the customer's body after first identifying the customer's body. The clothing is kept in a firebase. The picture is kept in the gallery for further viewing.

III. HARDWARE AND SOFTWARE COMPONENTS

Hardware components:

Raspberry pi: This is a small computer which is capable of connecting tv, monitors, computers and engages keyboard as well as mouses as input methods. It is capable of carrying out many different activities, including data base creation, high-definition video playback, military applications, internet browsing, and high-definition video playback. The Broadcom BCM2835(SOC) which is being used in the computer contains an ARM1176J2F-S 700MHZ processor, Video core IV GPU, and it is initially delivered with 256MB of RAM until being updated (Model B & Model B+) to 512MB. It lacks an integrated hard drive either solid-state drive, however instead requires an SD card for order to storage and booting, with the Model B+ utilizing a MicroSD.

Web Camera*:*The image that is being captured through web camera is streamed with the help of computer to computer network.. A web camera given a connection with the help of USB cables or other similar cables, or it may be integrated into computer hardware, such as laptops, unlike an IP camera, which connects using Ethernet or Wi-Fi. Imaging cameras known as USB Cameras transfer picture data using USB 2.0 or USB 3.0 technology. The same USB technology used by the majority of PCs is used by USB Cameras to connect quickly to specialised computer systems.

Dc motor:Motor specifications required for this project are: it must contain the voltage value of 12V,speed of 30rpm,current of 1amp,no. of motors required are 2 and we must select the weight it in such a way that it should be able to lift upto 5kgs.

IR Sensor*:* The IR sensor module is made up of five crucial components: an output LED, an operational amplifier, an IR transmitter, and a receiver. The IR sensor module's primary features and specs are as follows: I/O pins are at 3.3V and 5V, and the operational voltage is 5VDc. mounting hole, with a range of up to 20 cm and a supply current of 20 mA, Fixed ambient light sensor with adjustable detection range.

Software components: *Developer side:* IDE: Anaconda

Programming Language: Python, HTML, CSS, BOOTSTRAP.

Packages Used: Dlib (19.15.0), OpenCV (3.4.2.17), SciPy (1.0.0), Cascade trainer gui (1.8.0), Tkinter canvas (8.6.8), NumPy (1.18.1), Flask Web framework (1.1.1)

Front-end Languages: HTML, CSS & BOOTSTRAP

Backend Language: Python (3.7.4).

Programming languages:

Python: Python is a computer programming language that is being used in order to build websites, software, automate procedures, and perform data analysis. It is a high-level, interpreted, general-purpose programming language. With significant indentation, its design philosophy prioritises code readability.

Packages used:

OpenCV: The OpenCV-Python library is used to detect the skeleton part/point of the human .

SciPy: SciPy is an open source, BSD-licensed scientific library for Python that can be used in math, science, and engineering. The NumPy library, which offers quick and simple N-dimensional array operations, is needed by the SciPy library.

NumPy: Large, multi-dimensional arrays and matrices are supported by NumPy, a library for the Python programming language, along with a substantial number of high-level mathematical operations that may be performed on these arrays.

Cascade trainer gui:An application called Cascade Trainer GUI is used to train, test, and enhance cascade classifier models. It makes it simple to utilize OpenCV tools for training and testing classifiers by using a graphical interface to set the settings.

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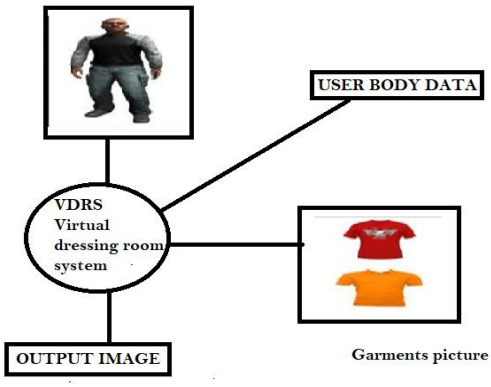
IV. METHODOLOGY



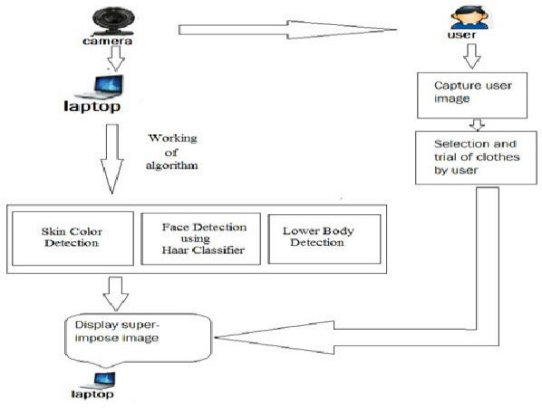
***Detecting and Sizing the Body*:** The acquisition of the body, head, or neck shape, depending on the wearable, is the first phase of the suggested online virtual trial room approach in order to establish reference points. In order to decide where to show a specific piece of clothing or accessory, reference points are then used.

Face Detection: The face is the discrete structure that must be recognised in order to detect the user, just as it is when the user approaches the screen. Therefore, we employ Haar feature-based cascade classifiers to detect faces.

Image Masking: This just involves setting some of the image's pixel intensity values to zero. The masked image's pixel intensity which will be obtained is automatically set to the background value, which is typically zero, wherever the image's pixel intensity value is zero**.** Instead, the ROIs for each slice are utilised to define the mask. In the ROI toolset, masking can be managed slice by slice if necessary. A slice lacking ROI is unaffected by masking techniques in the ROI tool.

Edge Detection: There are numerous edge detection methods for body detection. This edge detection method is carried out using Gaussian filters. These filters remove noise from digital images to stop the processor from making a mistaken identification.

Scaling of attire: Scaling refers to changing the image's size to fit the situation. The clothing should adjust in size and placement on the body as moving in front of the screen is the user.



Proposed Application: Python Flask Web Application Interface is used to create the application. On the website, users may examine clothing and other accessories and decide whether to buy or try them on.

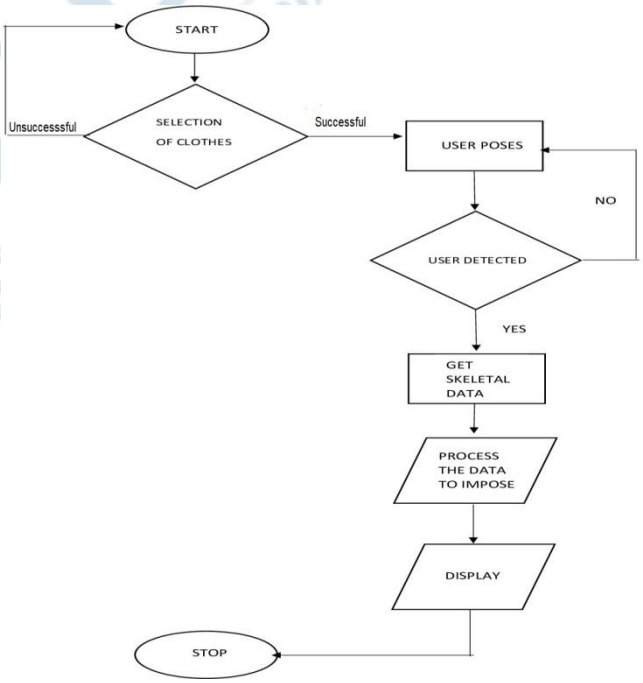
The working of the project goes like,

The customer must initially stand in front of the computer screen or LED screen of the apparatus (depending on the name of the figure). The device's camera will then interact with the user's body in a way similar to how it recognises the structure of the human body and, with the help of particular alignments, permits the addition of a particular product to the user's body.

Given that this project is real-time, OpenCV and its many modules will react to the user's alignment and allocate it to the user in an appropriate way. 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. The source, then, is where the project obtains its database (via. Internet).

The database-based computations and alignment of the product have been completed, and it is now accessible for testing by the user. Finally, the entire procedure is viewable on the system's LED screen.

By this, the project is Ready for its trial.



V. PROJECT OUTCOMES

1) Able to Display Date, Time and Weather Updates,
2) Finally, will be able to help in reducing the Workload of the Workers,
3) Able to Communicate with the interface using Voice Commands,
4) Able to gain the Knowledge on Raspberry pi, Image Processing and AIML Concepts.

VI. CONCLUSION

The popularity of internet shopping and people's desire to fully utilise it while purchasing clothing justifies the necessity to create an algorithm that digitally dresses people in the chosen items. When purchasing clothing, customers frequently need to spend hours physically trying on a range of garments. The amount of time that is available could not be enough, which could be tiresome. Using a virtual styling room that also functions as a trial room and employs live video feed is the suggested fix for this issue. The nodes and points of the human body are plotted using a Kinect sensor. This information is then used to construct an image of clothing over the user's body, obviating the requirement for actual fittings and reducing time. Technology that would make it easier for online buyers to try on various clothes would be greatly appreciated.

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