VIRTUAL E DRESSING ROOM

A **Project report** submitted in partial fulfillment of the requirements for the degree of

Bachelor of Technology

by

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Under the guidance of **Prof. Shital Raut**

DEPARTMENT OF
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VISHWAKARMA INSTITUTE OF TECHNOLOGY PUNE

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CERTIFICATE

This is to certify that the **Project Report** entitled **Virtual Dressing Room** has been submitted in the academic year **2021-22** by

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Acknowledgement:

We would like to thank our honorable director Prof. Jalnekar sir for inspiring us throughout the semester. We would also like to thank our guide Prof. Shital Raut sir who guided us with his inputs and his knowledge in completing our project.

Abstract:

People generally avoid purchasing wearables such as clothing, ornaments, and other accessories online since it is difficult to predict whether they would look well on them. We decided to create an Online Trial Room Application to address this issue. Our study is centered on developing an application that uses the device camera to record a video of the user and then separates the video into individual frames from which the user's body is extracted. Finally, functions are used to extract information about the location of joints in the body, as well as to morph, rotate, and scale the wearable picture onto the user in real-time.

One problem with buying garments online is that the customer cannot try on the item before purchasing it. The client's choice to buy garments is influenced by how they feel after wearing. As a result, there is a growing desire for virtual dressing rooms that imitate dressing imagery. As a result, most past research has taken the method of mapping a 2D texture to the user's body and creating an Avatar (model). We, on the other hand, adopt a more straightforward approach to dealing with it. Optimized OpenCV tools and frameworks, as well as React and the Firebase platform, were employed. The difference between the first and second models is decided by the action machine, which is represented by a gesture and symbolizes a user order.

1. Introduction

Purchasing wearable online is usually a dangerous endeavour since one never knows how the item will appear on oneself. Also, buying clothing or decorations in a store needs a significant amount of time since we must first locate a store and then try on each and every garment in the trial area. By streamlining the process, our suggested solution would help consumers save time while checking out wearables. We chose OpenCV because it is significantly faster and more pre-trained in detecting the user's body on which the fabric would be superimposed, saving them time while providing a better user experience.

Virtual Reality implementation is useless if it does not feel genuine, which is only achievable if the user can have the same sensation as they do while wearing a fabric, which is different from the sensation of wearing a cotton cloth vs a woollen cloth. Even if we couldn't deliver that degree of realism right now, we can at least make the user's view more realistic, as if they were trying the fabric on in a mirror inside a real Trial room.

Clothing is often available in a wide range of sizes and styles at stores. It is physically impossible for a consumer to try on all of the clothes without spending hours doing so. In addition, in order to try on some selected clothes in a real store, it is usual practise to queue and take turns using the fitting rooms. Due to the restricted number of in-store fitting rooms, most consumers must spend the majority of their shopping time waiting in lines (which will be even longer during peak hours). Customers' tolerance will be affected by extended wait times, resulting in poor customer satisfaction.

2. Literature Survey

The paper "Real-time 3D virtual dressing based on user's skeleton (2017)" describes how real-time 3D virtual dressing is based on users' skeletons being retrieved and monitored in real-time to drive transformation and fitting of clothing models. The advantages of this work are that human

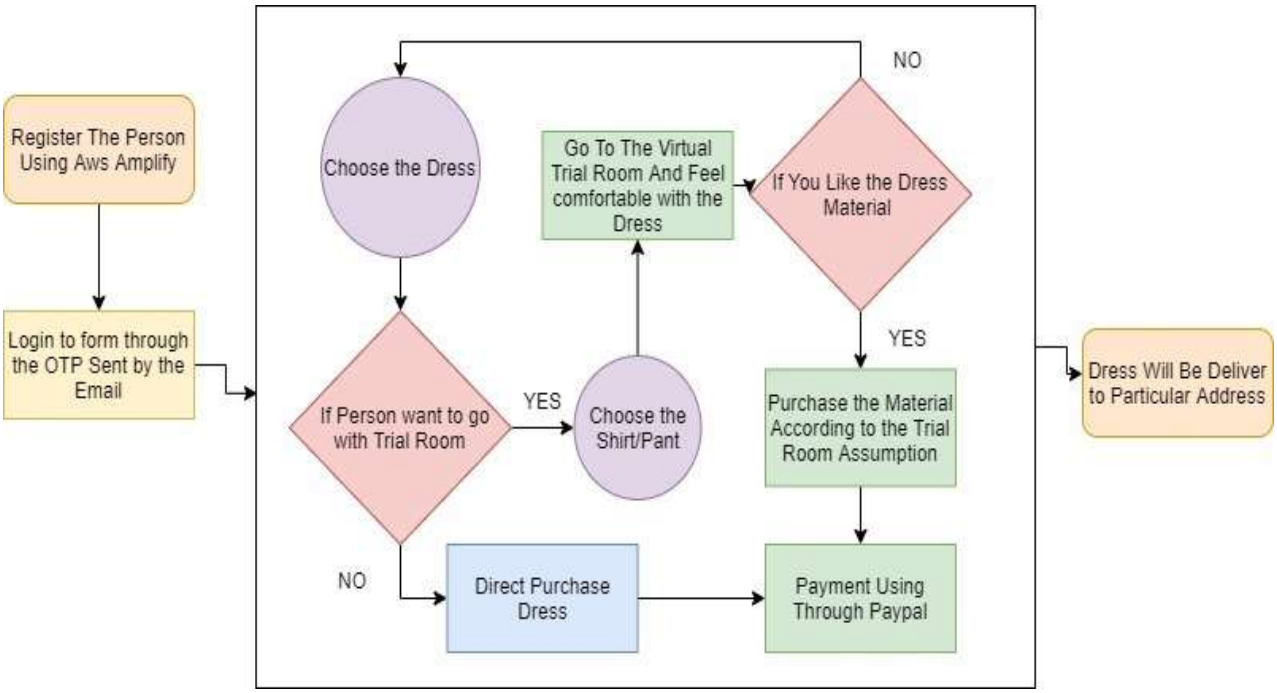
measurements are created based on the user's body standing in front of the machine, while the disadvantages are that the user must be separated from the machine to maintain a certain distance.

We looked at a number of papers that had the same notion of superimposing an outfit, mainly clothing, on a human figure. This allows the user to see themselves in a wearable without having to put it on. To begin, the user must face the camera, which concentrates the user's picture, and then dress it in different costumes and displays. This essentially aids the user in quickly determining his or her option and providing a higher degree of pleasure. According to the papers proposed by Shreya Kamani, F. Isikdogan, and Vipin Paul, the implementation of a virtual trial room application is proposed with the use of a hardware sensor known as the Microsoft Kinect sensor, which primarily takes a person's bone measurement as a way to determine the height of a person.

There are various commercial items on the market currently that allow you to digitally try on garments. The market has exploded with this. As a result, the most popular current strategy is to use Microsoft's Kinect and Asus's Xtion devices. When a person stands in front of a screen equipped with a Kinect scanner, the system identifies the human body and creates a human skeleton based on the coordinates. A 3D model of the user is created as soon as the building is completed. An android application is combined with the notion of augmented reality in a study submitted by Cecilia Garcia Martin. The suggested method augments virtual clothes on a user's static picture, and the entire programme is stored on an Android phone. Virtual Trial Room may be seen from a variety of angles and accomplished utilising a variety of hardware – software combinations.

One example is the application's development using OpenCV. Authors Nikki Singh and Sourabh Botre introduced this notion in and respectively. This concept provided cost-effective and accurate outcomes, and hence had a significant impact on our implementation.

3. Proposed Model



4. Methodology

A. Initializing OpenCV

OpenCV is a large open-source library for image processing, computer vision, and machine learning. Python, C++, Java, and more programming languages are supported by OpenCV. It can analyse photos and movies to recognise items, people, and even human handwriting. When it's paired with other libraries, such as Numpy, a highly efficient library for numerical operations, the number of weapons in your arsenal grows, since all of the operations that Numpy can do may be merged with OpenCV.

B. Capturing real-time video using CV2 packages

To record a video, follow these:

a. To retrieve a video capture object for the camera, call cv2.VideoCapture().

b. Set up an unlimited while loop and read the frames using the above-mentioned object's read() function.

c. To view the frames in the movie, use the cv2.imshow() function.

d. When the user presses a specified key, the loop is broken.

C. Detecting and Sizing body

We used a variety of approaches to get the desired body shape:

a. Filtering with thresholding, Canny edge detection, and K-means; and
b. Motion detection or skeleton detection, which included analysing numerous frames for any movement.

D. Face Detection

Haar feature-based cascade classifiers are used to detect the face. Instead, than using pixel intensity values, the haar classifier employs the difference in contrast values between adjacent groups of pixels. The image's relative bright and dark portions are then determined using the variance difference between pixel groupings.

E. Image Masking and Edge Detection

Picture Masking entails setting part of the pixel intensity values in the masked image to zero. The pixel intensity of the resultant masked picture will be set to the background value, which is generally zero, wherever the pixel intensity value is zero in the image.

Enhancement of colours and logos - In this scenario, we want the outermost contained contour to correspond to the T-shirt worn by the user or test item.There are several approaches for detecting edges. For body detection, we employed the Canny Edge detection algorithm, as previously stated. This edge detection approach is carried out in the following way: Filters with a Gaussian distribution are utilized. The programme uses Numpy/ OpenCV libraries for edge detection and Context Embedding to process user interactions.

5. Implementaion

Modern online applications are frequently created using a server-side language that serves data via an API and a front-end JavaScript framework that presents the data to the end user in an easy-to-use way. Python is a dynamic programming language that is extensively used by businesses and professionals. The language's basic ideals indicate that software should be simple and readable, allowing developers to be more productive and happier. Flask will also be used to help you rapidly create a Rest API. React is a declarative, fast, and flexible JavaScript toolkit for creating user interfaces that was developed at Facebook. It enables the building of rich, interactive, and stateful user interfaces from small, isolated code fragments known as components.

A. Frontend Implementation using React and Redux

React Redux is the official React UI bindings layer for Redux. It lets your React components read data from a Redux store, and dispatch actions to the store to update state. Redux maintainer Mark Erikson appeared on the "Learn with Jason" show to explain how we recommend using Redux today. The show includes a live-coded example app that shows how to use Redux Toolkit and React-Redux hooks with Typescript, as well as the new RTK Query data fetching APIs

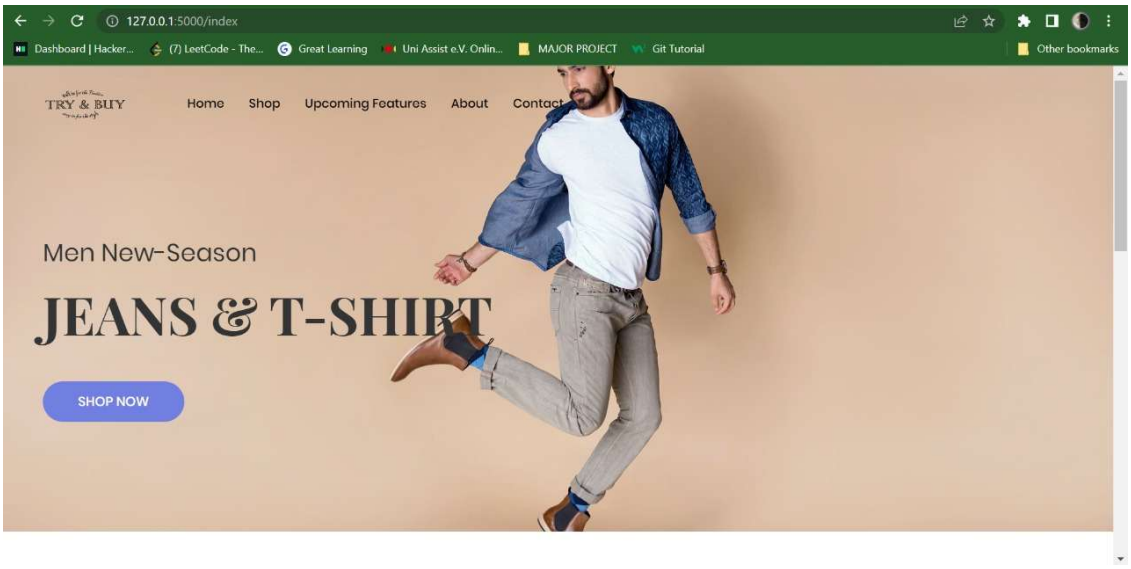
B. AWS Amplify

AWS Amplify is a set of tools and services that can be used together or on their own, to help front-end web and mobile developers build scalable full stack applications, powered by AWS.AWS Amplify is ideal for those who don't want to create their own backend or other components. The Amplify components make it simple to set up your app's building blocks without having to perform all of the work yourself.

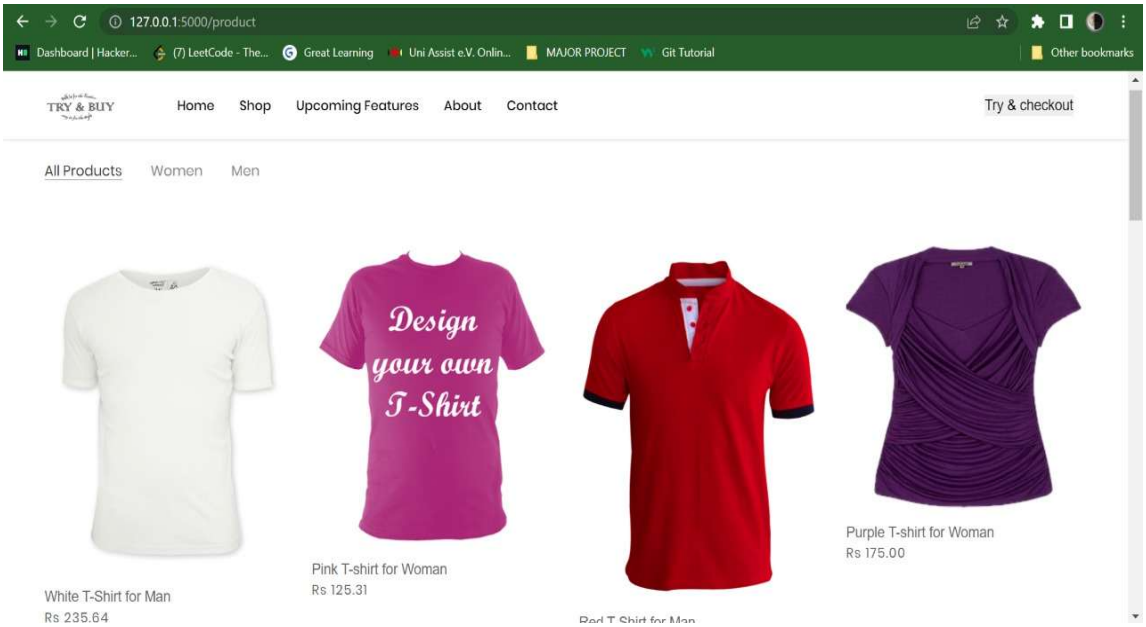
The Amplify Framework is a collection of client app development SDKs, frameworks, tools, and documentation. The Amplify Console is a web application delivery and hosting solution that runs in the background. Its goal is to improve the development experience by combining JavaScript with AWS. Amplify codifies best practises via programmatic interfaces, allowing you to connect with cloud resources with ease.

6. Result

Landing page



Product section



7. Conclusion

We described a dynamic texture overlay method from monocular images for real-time visualization of garments in a virtual mirror environment. Like looking into a mirror when trying on clothes, we create the same impression but for virtually textured garments. The mirror is replaced by a large display that shows the mirrored image of a camera capturing e.g., the upper body part of a person. A virtual mirror system is designed for the purpose of a cloth changing 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 system exchanges the color and the texture of a shirt while the person

wearing the shirt can move freely in front of the mirror and even perform elastic deformations of the cloth-like stretching and bending or move toward or away from the camera.

In conclusion, a Virtual Dressing Room was implemented successfully in Python OpenCV. This application can help users save time of going to the shops to try on attires which they can do online as well. The application can track user's movement and angles with respect to screen to impose the attire accurately super onto the user without having the user to align to the device screen hence improving user experience. The application can be used by online retailers and vendors to sell their wearable products which will surely attract more customers. Last but not the least there is a scope for improvement in the accuracy of the application specially when it comes to clothing which can be achieved by taking multiple snaps of the cloth in different angles and then aligning the angle of the cloth with the angle in which the user is standing tilted. Also having the clothes in multiple sizes like S, M and L will further improve the accuracy of the application.

8. Future Scope

Several stores have experimented with virtual dressing room systems and accompanying apps for several years, albeit most have been restricted in scope and yielded mixed results. However, a considerable growth in virtual dressing room use has occurred as a result of a combination of technology-driven improvements in quality and the pandemic moving shoppers away from physical retail locations.

Virtual dressing room implementation has been pioneered by global retail giants like Macy's and Adidas, with many smaller businesses following suit.As its online shopping strategy continues to gain market dominance, Amazon is also working on virtual dressing room development.

Virtual dressing rooms are quickly becoming a need for many shops. They've shut down their actual changing rooms and forbidden consumers from handling products the way they used to for fear of spreading COVID-19. And many people are just not visiting businesses in the first place.
In today's retail environment, the virtual dressing room provides a chance to reclaim some of the lost revenue that is squeezing most businesses' profit margins.

9. References

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