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Virtual Trial Room

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ABSTRACT:
The pandemic has changed the way a person lives from focusing on the Virtual stores more than the Physical stores and few major reasons are one will not be affected with the health issues, less cost, Variety of options, Different portfolios at one place and goes on. Since the usage of online buying selling is increasing more user-friendly developments are been made in the industry which is changing every minute todays update may be available with more advanced version the next day. So, in this paper we are concentrating on the changes, updates, technology that has changed the way Online Garment shopping works. As per a survey almost a person suffers online shopping applications for almost seven hours. The increase in the virtual life had created one best and game changing opportunity for the Fashion Business which is not just concentrating on the Brand promotion and online stores but much more advancement one such advancement is Virtual Trail Room which is nothing but a digital version of the Trail/Changing room in the shopping malls. For this project we are using the Microsoft Kinect Sensor which gives the user label data by extracting from the user video stream using the depth than based on the information the cloth is register along with the skin detection so has to adjust the order of layers by Kinect skeletal tracking data. Surprisingly the overlap between the cloth models and person is 84.76%.

Keywords: *Augmented Reality, Clothing, Microsoft Kinect Sensor, Human- Computer Interaction, Virtual*

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I. INTRODUCTION

Today people are showing interest more on buying online than offline and is giving a good amount of satisfaction in the fields of Books, Electronics, Tickets, Basic home goods etc and the reason behind this is all we need to know the basic features of it but when it comes to online shopping like Garments, Jewelry it becomes bit difficult to understand because of the measurements and the color difference hence advancement were started taking slowly to overcome as many issues as one can. Few such advancements started from online catalogue like Flipkart, Amazon, Myntra etc to live online assistance in shopping like 3Liveshop, Magic Room by WSS etc. Trying clothes in stores is generally more amount of time taking and will definitely have the physical contact. And after such a pandemic effect people are now scared to give such a try but can't stop themselves from buying clothes so has to make the satisfactory with the product that they have purchased we are proposing a simple yet effective method that is virtual trial room which is similar to a changing room in a shopping mall but we can try as many clothes as we want without any physical contact which in turn reduces the time, cost and easily accessible. [1]In this proposed method we are using the Microsoft Kinect sensor to track the measurements, Movement so as to create a virtual mirror with a video streaming later which each frame will have a cloth registered which will be merged with the video streaming. Other added advantage of this method is we can change the backgrounds and environment. Here the sensor detects the body and assign few points based on the points garment's images are masked. Hence in this paper, we will start with the explanation on current and proposed system along with the system analysis, its architecture, implementation process, results that we had obtained and conclusion, future scope.

II. SYSTEM ANALYSIS

Before we develop a solution to an issue one needs to know what is the current method its advantages disadvantages fields that is being used and what will be the consequences post updating or what can we do more in order to resolve the issues or the problems or the more better way all these can be understood by the process called system analysis. This process helps to understand the complete in and out of a system from which one will be able to understand on to how can we proceed further what all changes we can imbibe in order to make it better which in turn reduces the wastage in cost and helps in building more appropriate solution with most accurate results.

III. EXISTING SYSTEM

In the existing system in order to shop for any garment we will first try and then we will choose it and in the mean time it is time consuming to reach those places, physical contact will definitely happen and we may not be satisfied with the products we try every time. Currently Lenskart is using Augmented reality to try the Spectacles and Goggles. And for other fields like fashion business a physical appearance is needed as the measurements from one person to other person varies and lots of effort is required in order to overcome this issue.

IV. PROPOSED SYSTEM

The proposed system will be one of the perfect solutions for the issue where we are proposing for a virtual trial room where a person can try the model, he/she needed with the perfect measurements and in the color, they wish to along with the change in the background and the environment they are into. This reduces the amount of time they spent in travelling and changing, it doesn't require any physical contact and will have multiple options to customize which is generally not possible in the existing system. [2] It also helps the users to not limit them selves to one particular shop or area they can visit any shop in the world and try the garments to check if they will fit or not.

V. REQUIREMENTS

For any system requirements plays a major role because that gives us an idea of how much cost it is going to cost for along with the size of manufacturing it. Requirements can be classified into Hardware and Software where Hardware requirements give us the understanding on the interface and logical understanding whereas software requirements gives us understanding of the code, software to be used and below are the detail requirements for this proposed project.

- Processor : Intel i5, Ryzen 7
- Hard disk : 20 GB
- RAM : 8GB / 16GB / 32GB
- Input Devices : Keyboard, Mouse, SmartPhone (Android,IOS)
- Operating System : Windows 10, Linux
- Programming language : Python
- Tools and frameworks : Opencv, vs code, mediapipe
- Backend : flask

VI. ARCHITECTURE

The architecture of this virtual trail room consists of a user, web camera, few sensors, web page and output screen. The process starts with the user either uses the web camera or uploading one of their Photos. From these the sensors identify and capture the points than the image is masked with the cloth frame that is sent to the webpage and then the output is shown in on the output screen. [3][5] For this complete process we are using the Microsoft Kinect which had gained lots of interest in recent days because of the depth image sensor. Apart from these we will be using the frame work like OpenNI along with the Microsoft Kinect SDK. Kinect SDK is mostly used because of the ability of its to capture real time skeletal body tracker

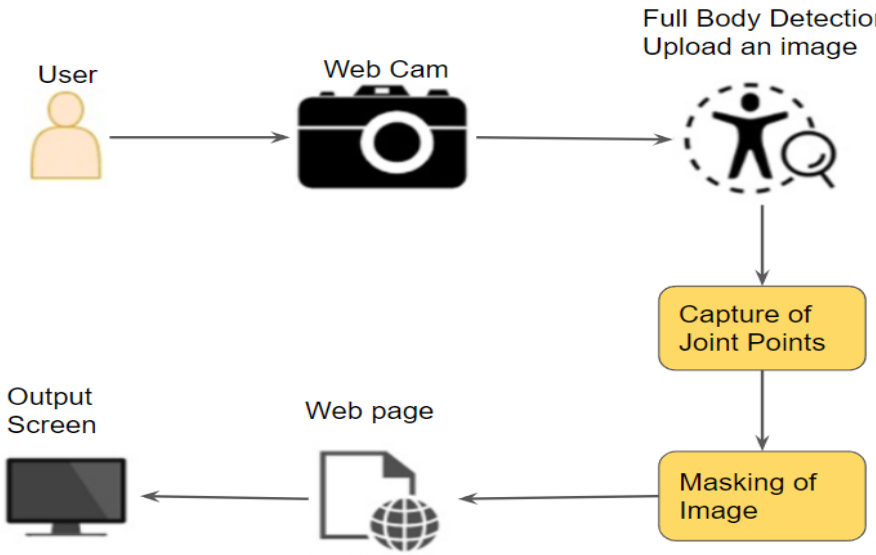

FIG -1 Architecture of the Virtual Trail Room

VII. MODULES DESCRIPTION

In terms of modules, we will be concentrating the below listed ones:

- User
- Detection
- Masking
- Output

a. User:

Through the user interface one will be able to choose the type of garment, color, style of their choice and will be able to add them to cart or as a favorite.

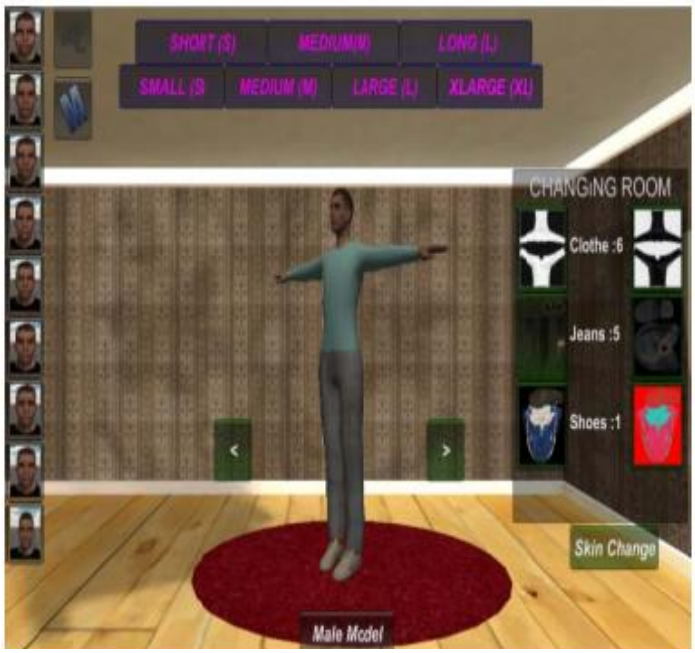

FIG-2 The User Interface Representation

b. **Detection:**

The detection module uses a framework called Mediapipe which helps in the detection of body points which helps in masking the video feed for a given system.

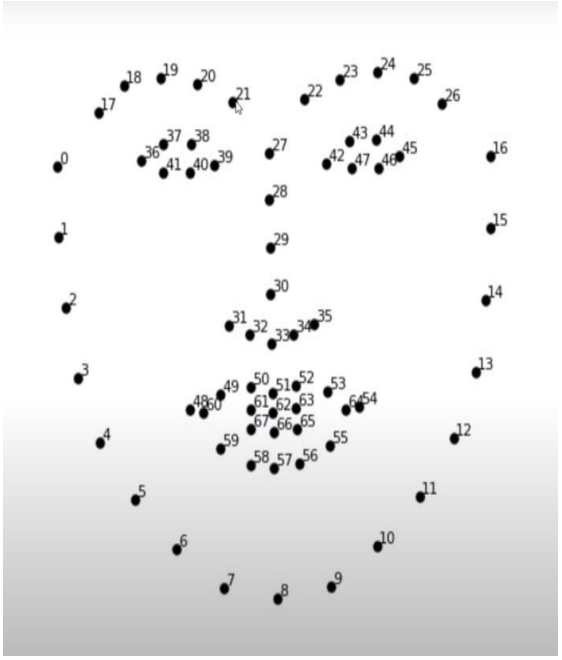

FIG-3 Face Detection Points

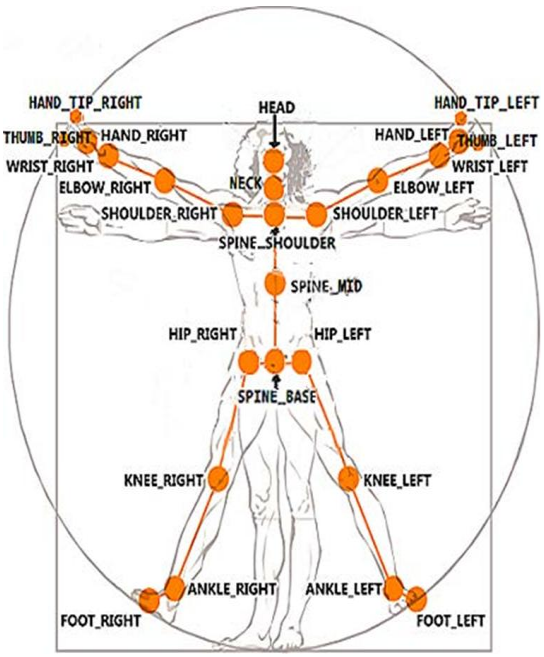

FIG-4: Body Detection Points

c. Masking:

This module helps in masking the garments to the user using the body joints that are detected from the detection module

d. Output:

Output module provides the output of the user after the masking is done from the video feed and the masked video feed is a real time masking.

VIII. USE CASE, SEQUENCE, & CLASS DAIGRAM

These diagrams give a picture of the detail process we follow from capturing the image to the displaying the output.[4]

i. Use case Diagram:

In this Diagram user can browse the Garment catalogue, view different types of garments try them and save the snapshot. In this module the first step is capturing the body skeleton joints and masking the garment on the users image or uploaded image and then the sent to the user as a image that will be saved as a snapshot.

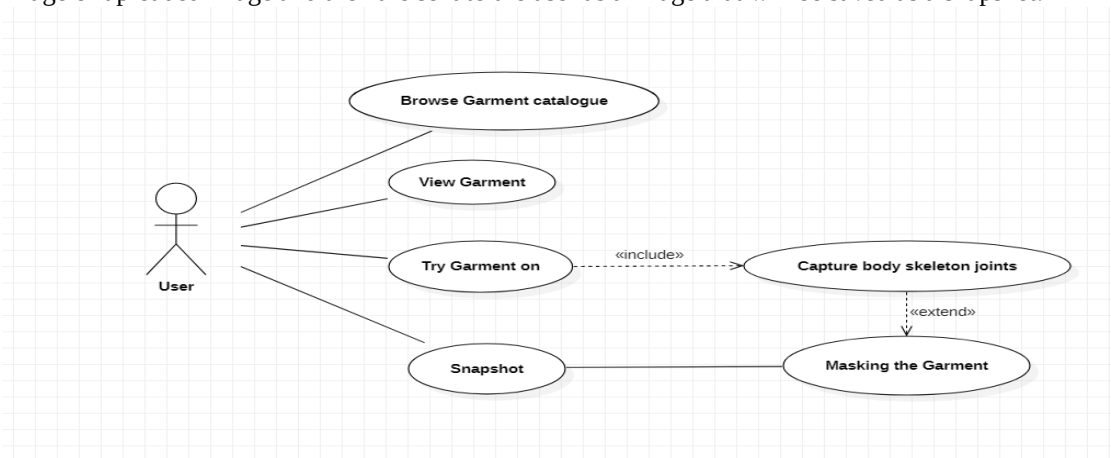

FIG -6 Use Case Diagram for User

ii. Class Diagram:

This diagram collects the class and objects which has the browse catalogue, try and add to cart options post which the input is taken from the input image or the image captured from the camera in the form of body joints and than proceeds to masking class which will mask the selected garments on the person based on the body joints and the output class will save the image using the Savesnap operation.

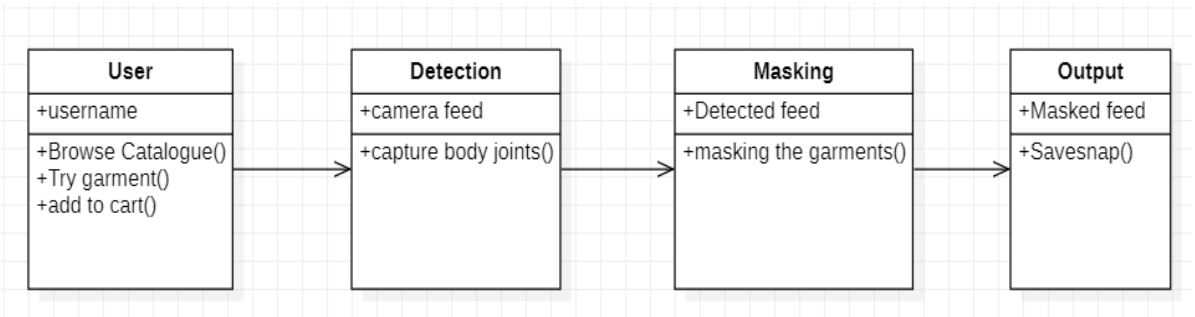

FIG – 7 Class Diagram

iii. Sequence Diagram

The sequence diagram has the two cases user and detection sequence where user sequence detection user will be able to browse the garments and if he/she likes than they will save and will get the output in the form of snapshot if not they will browse other garments of their choice.

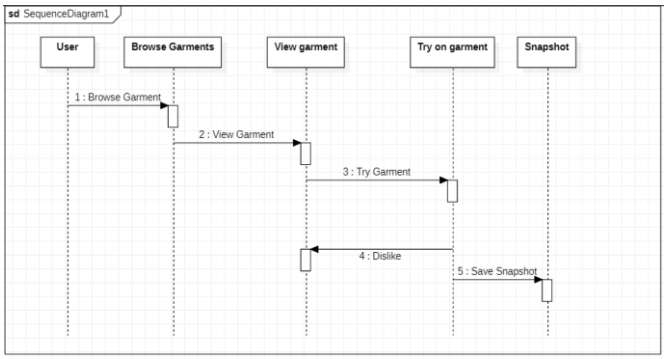

FIG -8 Sequence Diagram of User

The Detection module used when there is some distance between the user and the camera and the module interacts with the joints upon capturing and then interacts with the image to mask the garments and the final masked output is given to the person in the form of snapshot.

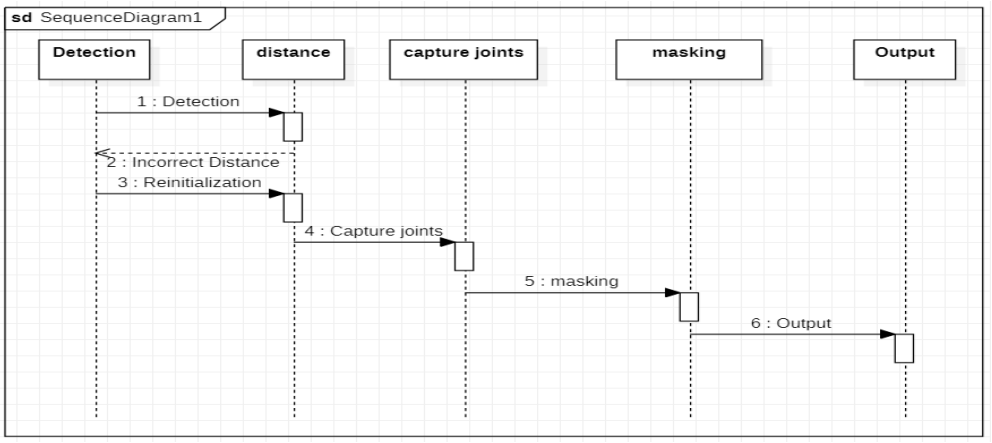

FIG – 9 Sequence Diagram of Detection

iv. Activity Diagram

It gives the flow from capturing input to the final output. It starts with the browsing, viewing, trying the initializing the capture if it has corrected distance than it will capture the joints and snapshot is provided if not distance is adjusted and then captured.

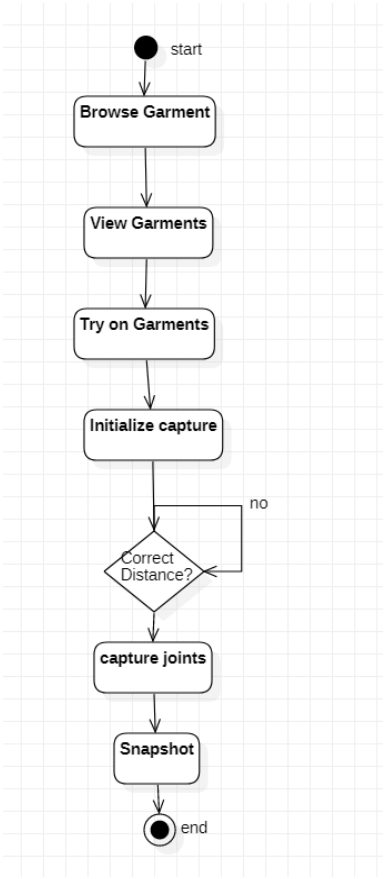

FIG -10 Activity Diagram

IX. TESTING

The purpose of testing to find the final errors or to know what else we can do in order to improve the solution. There are different types of tests which has a specific requirement.

a- Unit testing: This test is used to test the internal configuration each one individually it makes sure that the requirement is performed as expected and contains clearly defined inputs and expected results.

b- Integration Test: This test is used to check the integration with different system i.e., the connection between one module to another module it might be within same system and different module or different system and different module.

c- Functional Testing: These tests help in understanding the valid/invalid parameters which function to be used what should be the output when an input is given along with the systems that has to be invoked when a parameter is given.

Browse garments

Test case ID	Test case name	Purpose	Test Case	Output
1	Users browse the garments through GUI	To browse the content and view the desired products	The user browses the garments and view the garments	The garments are successfully displayed

Try Virtually

Test case ID	Test case name	Purpose	Input	Output
1	Try desired garments virtually	To try the desired garments virtually	User tries the desired garments virtually using the camera(User live feed)	The desired garments are virtually projected on user live feed

X. RESULTS

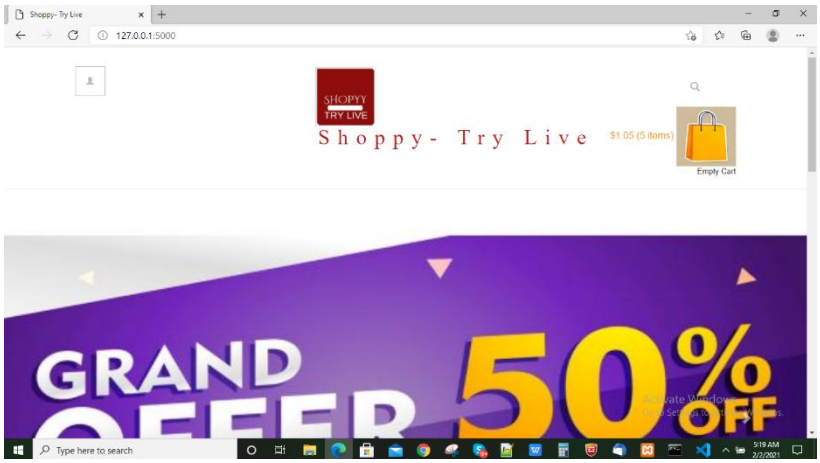

FIG -11: USER INTERFACE 1 (Basic Design)

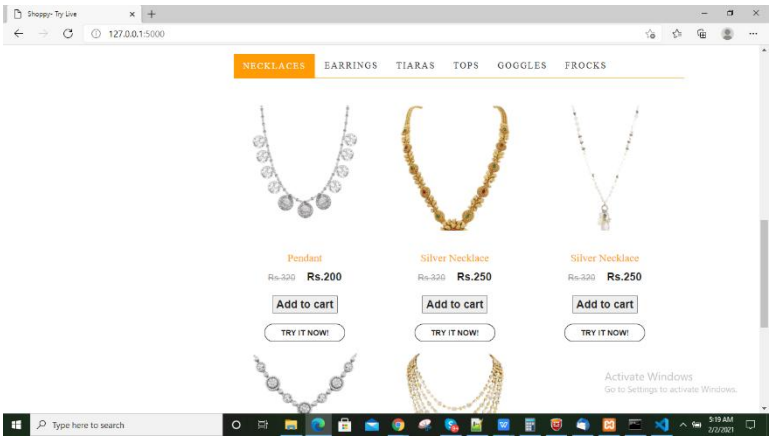

FIG-12: Browse Necklaces (User Interface)

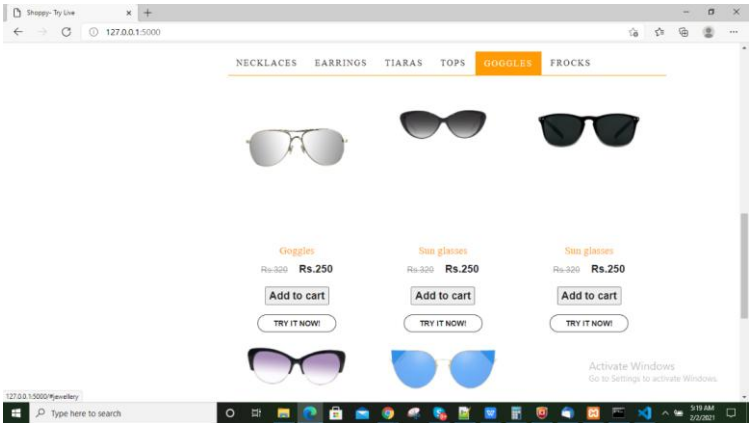

FIG -13: Browse Googles (User Interface)

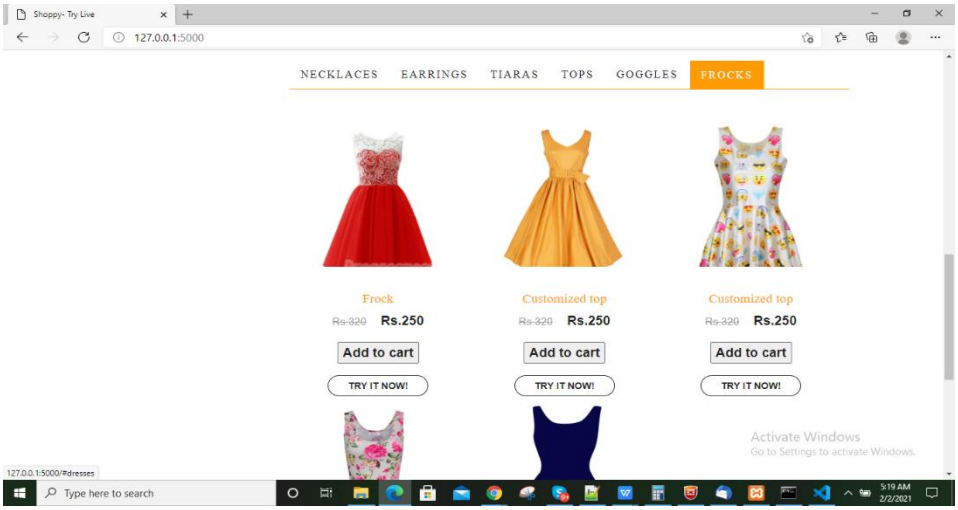

FIG - 14: Browse Frocks (User Interface)

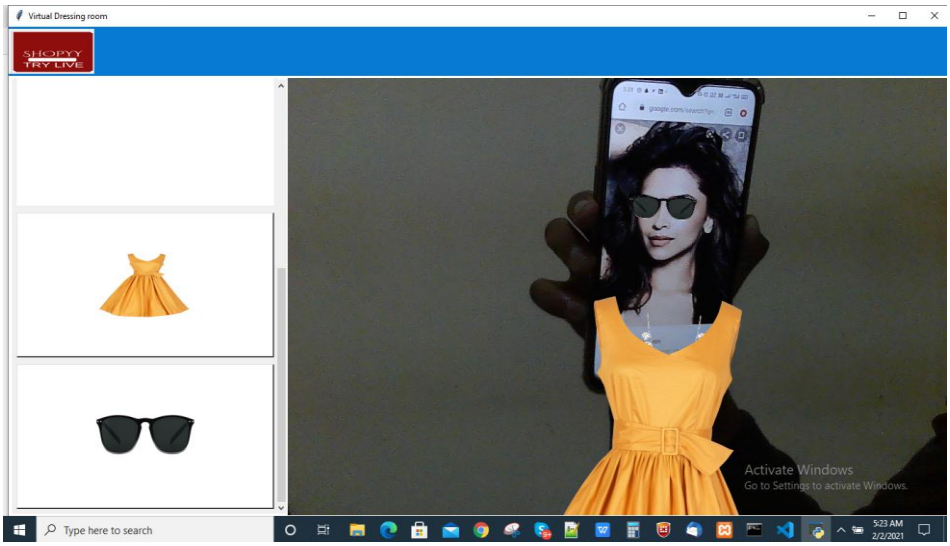

FIG - 15: Output 1 (Detection and Masking)

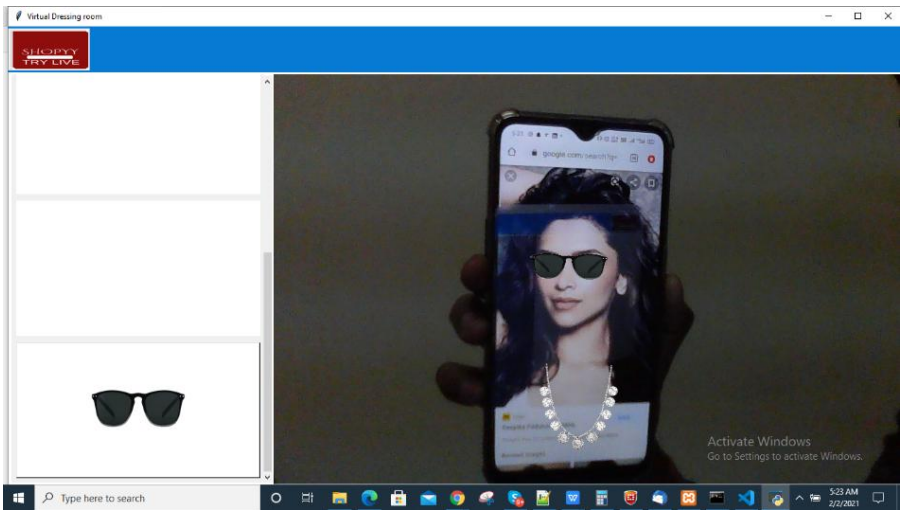

FIG – 16 : Output 2 (Detection and masking)

XI. CONCLUSION & FUTURE SCOPE

From this proposed system we will be able to overcome many factors such as one can save time without travelling to the shop, one can reach many brands from one place, one can try n number of garments without any problem and can be of their choice and color, type they can also design based on the environment and the background. Since the navigation is user friendly one will be able to use it very easily. Overall, this solution helps in reducing time, improving the selection process and in current pandemic the physical contact is also not there. In future we can develop more options into it like adding similar products search, more customization options and all the matching to be shown once a garment in selected, we can take it to 3D Level where user can get more user friendly snap shot of how it looks when they choose a particular garment.

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