Augmented Reality Try on Fashion Accessories with Two Techniques

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Abstract— Retail is evolving and adapting to digitalization, but there are some problems that customers can face when purchasing products online. In retail stores, there are also some problems that customers can overlook like sometimes they didn't find what they are looking for. Then, queuing for the fitting room in big malls and cloths shops. So, for both platforms E-commerce market and offline Shopping shop have some problems regarding its functionality. Talking about the online stores-especially in the case of wearing, where products can only be viewed-does not provide a better user experience. Whereas, AR offers a level of personalization to the customers where they may see themselves in all the outfits to know which would look best on them. As a solution, Augmented reality (AR) is the real-time use of information in the form of text, graphics, audio, and other virtual enhancements integrated with real-world objects. So, we are providing service that enables customers to try fashion accessories from the 3D models. The customer can just select accessories and point the mobile camera, they can see how it looks like on their body. customers can try the different product on just fingertips.

Keywords: 3D Model, AR, Detection, Feature Points, Accessories Unity, Vuforia

I. INTRODUCTION

The E-commerce market is immersive increasing every year and that also increases the online shoppers. but there are some limitations that customers can face when purchasing products online. customers sometimes got attracted by the model look on the website, but when they got it, they didn't satisfy with it and then they return it but the process is still frustrating and time-consuming.

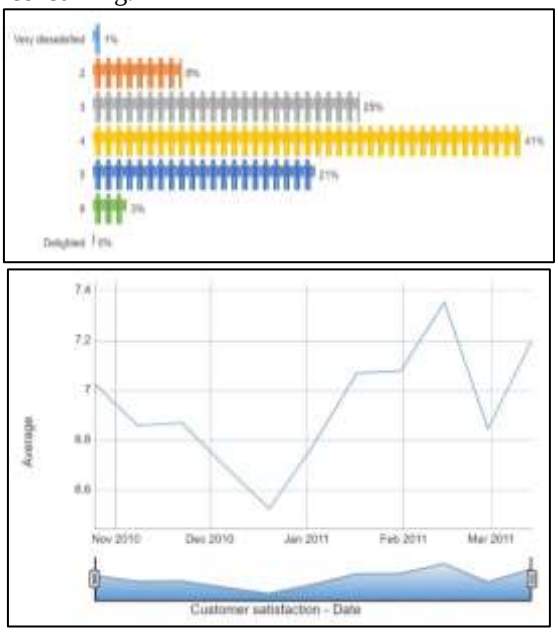

Fig. 1: survey of dissatisfying people on internet

A. Aim and Objective

Our research aims to provide service that enables to Try-On different accessories from 3D models. Talking about e-commerce store in case of fashion accessories, where products can only be viewed that does not provide a better user experience. So Augmented Reality presents personalization that offers customers a better experience. we are providing a replica of real accessories so by selecting the interesting products customers can visualize how a particular product suite on him. The overall purpose of our project is to make the shopping experience better so they don't have to go to local stores for trying different products and don't have to try all products physically, and the other side reducing the returns that will reduce the loss caused by returns. Our main aim is to make the shopping experience for customers better and interesting so that they will not be stuck in a frustrating return process.

B. Brief Literature Review

Image reorganization is an important component of Augmented Reality. By identifying the makers already embedded within the system, physical world objects are detected for the superimposition of virtual elements. At first, the image frame is captured through a mobile camera. and then the object is being identified from the captured image frame using object detection technique. The object detection is the method of detecting object using computer vision. this identified object is compared with tracker data which is on the cloud. After identifying the tracker data, the virtual object is rendered on the screen. For Instance, the customer is willing to purchase a watch so he will select that model and put the mobile camera on the tracker. first, the object detection technique is performed to get identify the features points than the 3d object of the watch is rendered on the tracker. There are two genres of Augmented Reality:

1) Marker-based AR: To fulfill it, first we must create a marker to put the object on that marker.
2) Marker-Less AR: In this type, AR is automatically identifying the object from the key feature and put the object on to that place which we had stored previously on our database.

C. Prior Art Search

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Applicant Name(s)	Prince Ghoghari	Dhaval Bhadani
College Name	Sarvajanik College of Engineering and Technology	
Technological Area	Mixed Reality	
Technological Domain	Augmented Reality	

Technological Sub Domain	E-Commerce and Clothing Shops	
IPC classification No.	G06T 19/006	G06F 3/011
	G06F 3/005	4. A63F 13/92
Proposed Title	Augmented Reality Try on Fashion Accessories with two techniques	
Key Objective	Customers try-on fashion accessories in the augmented world.	
	Number of return claims will be reduced.	
	Customers don't have to go to local stores.	

II. WORKFLOW AND TECHNOLOGIES

A. Workflow of AR-Try On

It works on computer vision. By identifying the markers already embedded within the system, the physical world objects are detected for superimposition of virtual objects. At first, the image frame is captured through a mobile camera. Then the object is being identified from the captured image frame using object detection technique. This identified object is compared with tracker data which is on database. After identifying the tracker data, the visual object is rendered on the screen.

There are three methods of it.

- Object Detection: It detects the object from visual using a mobile camera.
- Motion Tracking: It tracks the pose of an object.
- 3D Rendering: it renders accessories instead of object pose.

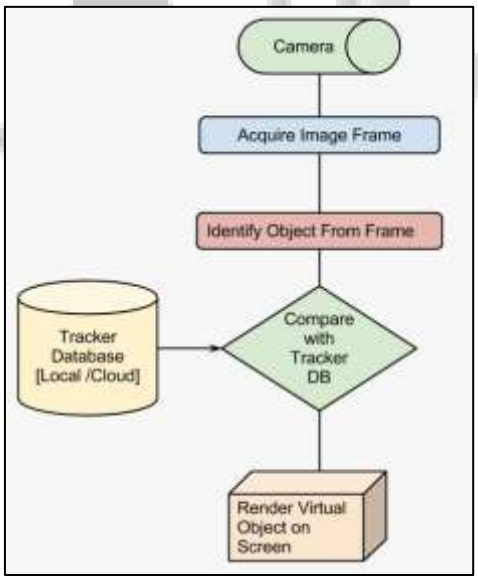

Fig. 2: workflow of AR Try-on

B. Materials / Tools

1) Unity provides powerful tools to make rich, deeply engaging AR experiences that intelligently interact with the real world.
2) Vuforia is an augmented reality software development kit (SDK) for mobile devices that enables the creation of augmented reality applications. It uses computer vision technology to recognize and track planar images and 3D objects in real time.
3) C# is the language which is used to create the application user interface.
4) AR-core is helpful to decrease our problems and we can do anything very easily with augmented reality.

III. BUSINESS MODEL CANVAS

The Business Model Canvas is used to validate the market significance of products and services, taken up for the research in this case. Technology projects are often solutions or processes that solve a technical problem. However, the implementation for the market of such solutions also requires that the problem solution is designed. In this model, we have included key partners, key activities cost structure, revenue streams and value propositions etc. There are many modules available in business canvas model such as key partners, activities, propositions, customer relationship, customer segments, channels, key resources, cost structure, revenue streams.

Figure 3: Business model Canvas

IV. RESULTS

A. Technique 1: Marker-Based AR Model of Watch

We created the database on Vuforia platform that help to find features points in the image. That features points helps to identify the image whenever mobile the image is brought in front of mobile camera.

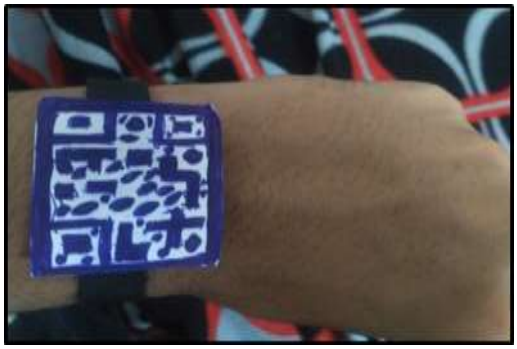

Fig. 4: Target Image

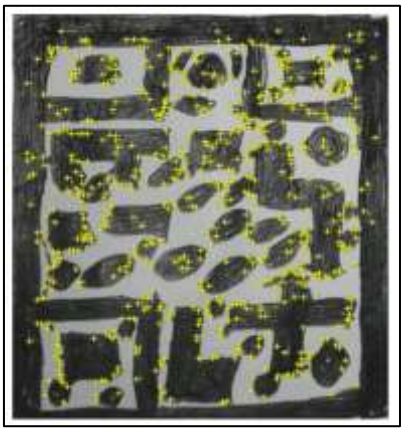

Fig. 5: Feature Points detected on marker

In this marker object, there are much higher number feature points available to capture the marker and render the 3D model on it. From Figure 5, we observed those feature points that is helpful to detect the marker in marker-based AR.

Fig. 6: Preview of Render Objects

B. Technique 2: Marker-Less AR Model of Ring

The system contains two modules. First one is Hand and finger detection using OpenCV and the second one is the Placing ring at the feature points. The hand and finger detection are based on skin color detection. This System is initialized by sampling color from the hand of the user with the help of seven square color trackers. As per figure 7, The hand (the foreground) is then obtained from the background by thresholding with the sampled color profile. Each of the seven colors in the profile generates a binary segmentation image. Next, all these seven binary images are added up to create a single binary image. This binary image is made smooth and denoised using image median blurring filters.

1) Hand and Fingure Detection Using Opencv

The hand and fingers detection are based on skin color detection. The application is initialized by sampling color from the hand of the user with the help of seven square color trackers or ROIs. The hand, the foreground, is then extracted from the background by thresholding with the sampled color profile. Each of the seven color in the profile produces a binary segmentation image. Then, all these seven binary images are added up to form a single binary image. This binary image is made smooth and denoised using image median blurring filters.

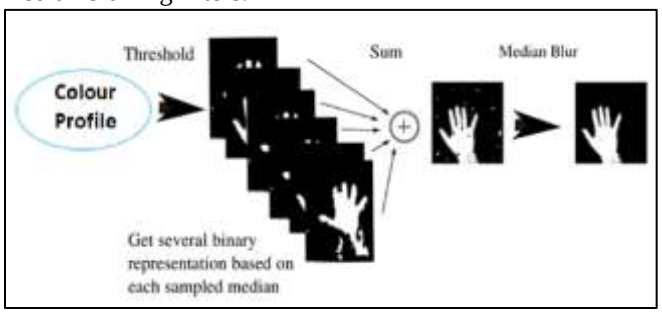

Fig. 7 : Made image smooth and denoised to process further

After the generation of the binary representation of the hand, the image is processed in the following manner:

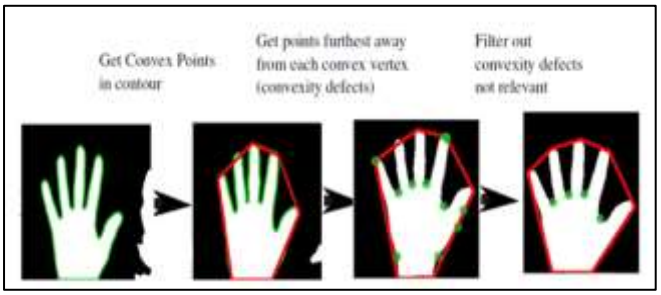

Fig. 8: Binary representation of user's hand

Now, to finally place the ring on the user's finger, the coordinates of the two leftmost convexity defects are found.

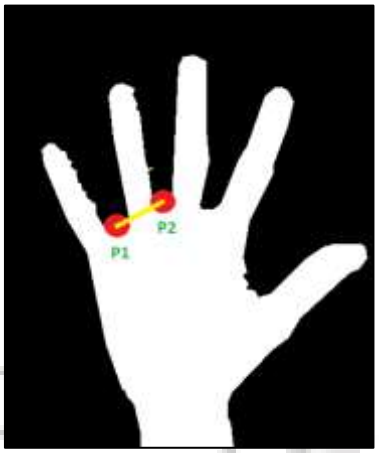

Fig. 9: Coordinates of user's hand

C. Result of AR Rings on Hands

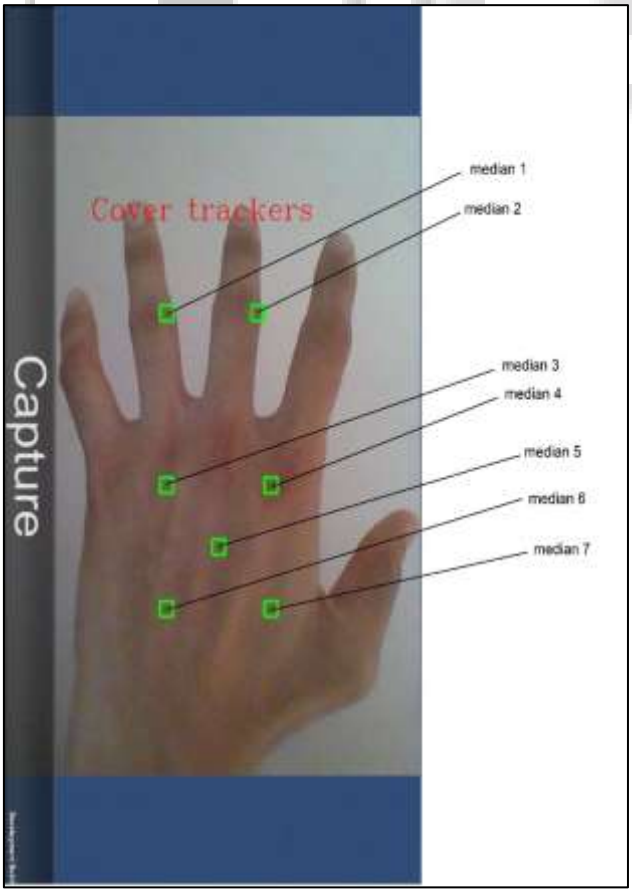

Fig. 10: Hand cover trackers

Fig. 11: Render ring object on finger.

Points given above is the median points from which the AR system can identify the object on which 3D model will render. And it is called as Cover Trackers. As per fig. IV.III.I, there are nearly 7 median points to identify the hand.

V. CONCLUSION AND FUTURE WORK

Augmented Reality Try-On uses tracker data to identify an object using a computer vision technique and then render the 3d object.so we are expecting to add object detection that detects hand by identifying hand features and rendering different accessories using that feature points that tracks evenly well as you move and rotate your hand or change camera angle. we are making it more user interactive and realistic. It can be improved for a range of products like glasses, shoes, jewelries, and other accessories. Online retailers can use this system to make customer to enhance their online shopping. Features of this model, [1]Interactive shopping experience, [2]visualization of product in real world, [3]augmented reality experience in mobile phone. In conclusion, the system is working in two parts. In the first part, hand and finger detection is done by OpenCV and then in the second part, the 3D Model is placed on feature points. We also designed Business model canvas which helped us to visualize market issues, customer expectations, and revenue sources as well. The project is helping to enhance the online shopping experience. There are some advantages of the model: [1]increase conversions, [2] more interactive and richer human-computer interactive, [3]Brings the components of the digital world into the perception of the real world, [4]Better user experience while online shopping by trying virtual products, [5]wear a variety of products and variants ant see fits best for

customer, [6]No need to wonder at different local stores to find the best product.

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