Virtual Try of Watch using Augmented Reality and Image Processing

Manishankar prasad jaiswal, Sanjay kumar, Arib Rabbani, Manish kumar goit, Arbind kumar Gauro
Tula's Institute, Dehradun, Uttarakhand, India

Abstract:- Today and tomorrow, we can't imagine lives without technology such as Internet, Laptops/Computers, Mobiles. Everything is being fulfilled by these technologies. In early days, the process has been well develop for buying items. Before covid-19, the technologies were well develop but the useability and engagement of the technologies were found more during and after covid-19. We have seen the practice of buying watches, but it was not possible to check how the object actually looks on the user hand by sitting in the home. And whenever user wants to buy a watch, they are unable to experience all the color. This might be due to out of stock and also sometimes the retailer feel irritates because of number of trials performed by the buyer. So, we come up with the web application where we have implemented the Augmented reality where the watches are superimpose on the real-world environment. This project provides you a 2D representation of apparel on our hand using marker-less based augmented reality. The advantages of using this concept is the user can get a better deal and experienced how it fits his/her hand instantly rather than placing an order and trying it out and returning it if it doesn't fit properly. Trying and trying watches loses its shines and light.

Keywords:- Augmented Reality, Virtual watch try, image processing, wrist watch.

I. INTRODUCTION

Today, the technology is enhancing and booming day by day. Technology is changing every traditional method of buying and selling. Augmented Reality has been the hottest topic in the technology point of view. Augmented Reality, is a technology that place the 3D objects on the Real world. Computer generated graphics are augmented on Real world environment and it is imposed in such away that user can't distinguish between virtual entities and real entities.

Consumer's buying habits have been changed when online shopping comes into practice. People are increasingly preferring to online retail stores for their shopping experiences.

However, this change in customer behavior is producing a slew of issues for retailers and manufacturers alike. There are numerous fundamental challenges with online buying that businesses must overcome to remain competitive in today's market.

So, AR recommend "Virtual try". Virtual try on refers to trying on digitally created objects like garments or accessories or any objects in a virtual environment. That means you can see how those objects or items look on you or on your avatar, allowing you to know if something is a good fit without physically trying it on. Hence, virtual try-on technology could let you try on watches without having it shipped or even leaving your house. We just need a mobile, phones.

There are mainly two types of Augmented Reality.

A. Marker-based AR

Marker based AR, also known as image recognition AR. In marker based augmented reality, it requires a fixed/static image or we can say target image or trigger image. The users scan this static/fix/target/trigger image using mobile phone. The static image provide a hint to show the object on that place. It is excellent way to place the object but the normal user can't select the static/trigger image that give useful features points. Due to which the result may vary also.

B. Marker less AR

In marker less AR, it doesn't requires a fix image or we can say target image or trigger image. Marker less AR works by scanning the real world environment surrounding. This application has already a functionality to detect flat surface like table or floor to place 3D object. It's experience are possible due to the better advancement in cameras, sensor, processors and algorithms capable of accurately detecting and mapping the real world.

II. LITERATURE SURVEY

Various Researches have been done on Augmented Reality and various application has been created in the field of IT sector. Therefore, in this literature survey, we will talk about some of the researches which has already tried AR on objects like Watches, Shoes, Furniture and many more.

- Madan Mohan.M, D.Santhosh kumar, Ajay.k has created an Application named "AR Watch Try- On Application for Android Devices". They have uses Vuforia Framework (For detecting the real world environment), Blender Software (Software which offers a comprehensive creative features set for 3-D computer animation, simulation, rendering and composition) and Unity 3D (for setting up light, shadow and camera position) .

- Prateek Singh, Prof. Ajay Kaushik has proposed a model named "Watch Try on using Augmented Reality." They have uses Unity Game Engine, Vuforia SDK for the development environment and C# language for programming the functionalities. This system can be considered as the basis for a more complex AR systems.

- Sarthak Gupta, Monil Pahwa,Prayant Gupta and Surinder Kaur has created an Augumented reality Application called "Arzara". In this model, in order to try watch on hand, users have to wear a band. They have used Vuforia for feature

extraction, Blender and Maya software for designing watch 3D models and Unity 3D for building an application.

- Snehal Mangale, Nabil Phansopkar, Safwaan Mujawar, Neeraj Singh has proposed a model named "Virtual Furniture using Augmented Reality" is a web based application where customers/users have to place the marker in the room where they want to try furniture items. The application superimposes the furniture on the real word environment and allow users to feel as if it is actually placed in the real world.

- Augmented Reality Games are most common technology in which we can see the complex form of Augmented Reality. The most common Games in which we can explore this concept are Pokemon Go, Treasure Hunt, Real Strike, Zombie Go and many more.

III. METHODOLOGY

The whole implementation is divided into three modules:
- Hand detection module
- Watch detection module
- Trying watch on hand

A. Module 1: Hand detection

In order to determine the size of the wrist from the image provided. We have gone through some finite steps. At first we need to detect the hand from the provided image. The image provided will be 2-D image taken from the mobile. We have extracted the key points from the picture using mediapipe library. Mediapipe recognition can be used for joint detection in body as well as hand. The extracted key point will help us to find the length of the wrist.
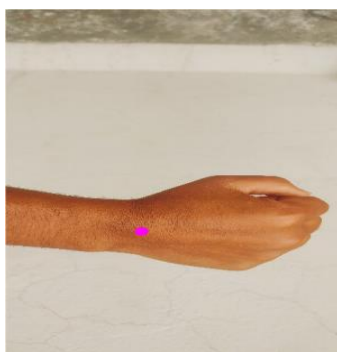

Fig. 1: Hand Pose detection

Fig. 2: first coordinate from the list using mediapipe returned by mediapipe

But in our case, we need to detect hand wrist and it is possible through mediapipe hand pose detection. It provide features to find key points on our hand. They are also known as landmarks. It mainly consists of bases of the fingers, joints, and tips.

B. Image processing

It is very important to have consistency in the data. In our case the data is image which may include complexity, inaccuracy and inadequacy. Due to this reason, image processing is important to achieve high accuracy and desired result. Using image processing, first we convert the input image into grayscale and then resize into a fixed size(300 * 500).

Till now, we haven't find our desire key points from where we can find the length of the wrist. We have converted the coordinates return by mediapipe into list and taken it's first coordinates as its centre of the hand. It still not enough to superimpose watch on the hand wrist because we don't have the length of the wrist. To find the length of the wrist we use Edge detection technique.Edge detection technique is an image processing technique to find the boundaries of the selected image. We have now boundaries of the hand as shown in figure below.

Fig. 3: Edge detection

Edge detection technique gives the set of co-ordinates and we don't know which two coordinates should we select to find the length of wrist. So, with the help of the first co-ordinate of the set returned by the mediapipe, we will get our desire two co-ordinates which will be enough to find the length of the wrist. After calculating the centre(x, y), we then moved to the point towards Y- coordinate of the centre value until the Y-coordinate is matched with the Y-coordinate of the points of edge. Which forms a straight line between the center (x, y) and coordinates (a1, b1) of the edge. Similarly, we move the points towards (–Y)- coordinates to get (a2, b2).

Now, let the distance between (a1, b1) and (a2, b2) = x ----(1)

This time we can say 'x' is the length of the wrist.
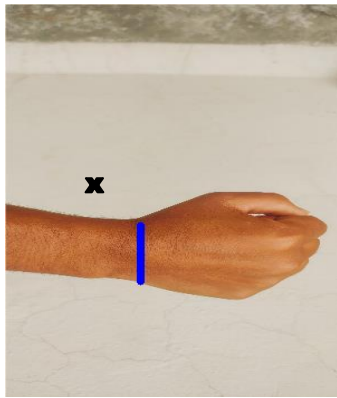

Fig 4: (a1,b1) and (a2,b2) from edge detection

Fig. 5: Distance between (a1,b1) and (a2,b2) = x

C. Module 2: Watch detection

Before superimposing watch on hands(wrist),we first apply pre-processing technique to the image of watch. Here, we are resizing the image in the order (width, height) = (60 px, x) ------- equation (2),taking x from equation(1)


Fig. 6: Sample watch image

D. Trying watch on hand

Now, we have to place the watch right above the wrist on accordance that the length of the watch should be equal to the size of the wrist. We have already define the size of watch image i.e. (x, y). Now, to place the watch exact above the wrist we placed the first end of the watch i.e. x to the (a1, b1) coordinates of the wrist.

Fig. 6: Virtual try of watch

IV. FLOWCHART
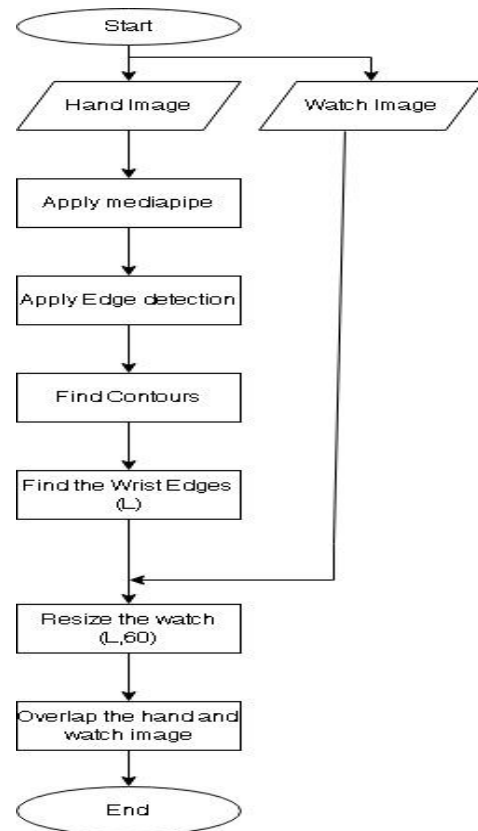
V. CONCLUSIONS

In this paper we have explained how to try on 2D watch using AR and image processing. We have explained the technologies and the methodology behind it. The upside of this system is the seamless experiences throughout the cycle of trying out various item in AR environment.

Currently, the designed system is confined to a simple application but this system can be used as the basic for a more complex AR system. This type of system can also be integerated into various online shopping stores and users can get a 'Try in AR' whenever they are using a mobile or any devices.

So, it is a safe to assume that the market share of AR is going to increase and in such times where a threatful virus has spread across the world.

VI. FUTURE SCOPE

The idea proposed in this paper is scalable and simple to use. It is not as vast as we think. In future, they can be used to try on any digital objects like garments, goggles, hairstyles and many more. It can be used by every type of retailer. It can be used in shopping malls, medical science, interior designing, architects designing.

REFERENCES

[1.] Madan Mohan.M, D.Santhosh kumar, Ajay.k(2021) - AR Watch Try- On Application for Android Devices.

[2.] Prateek Singh, Prof. Ajay Kaushik(2020)- Watch Try on using Augumented Reality

[3.] Mark Yi-Cheon Yim, Shu-Chuan Chu(2017). Is Augmented Reality Technology an Effective Tool for Ecommerce? An Interactivity and Vividness Perspective. Journal of interactive marketing.

[4.] Sarthak Gupta,Monil Pahwa,Prayant Gupta and Surinder Kaur(2020)- ARZARA: Augmented reality app to try watch on your wrist

[5.] Snehal Mangale, Nabil Phansopkar, Safwaan Mujawar, Neeraj Singh. (2016, May). Virtual Furniture Using Augmented Reality. IOSR Journalof Computer Engineering. http://www.iosrjournals.org/iosr-jce/papers/Conf.16051/Volume1/9.%204246.pdf?id=755

[6.] Khushal Khairnar, Kamleshwar Khairnar, Sanket kumar Mane, Rahul Chaudhari. (2015, Oct.). Furniture Layout Application Based on Marker Detection. International Research Journal of Engineering and Technology. [Online]. 02(07). p-ISSN: 2395-0072, e-ISSN: 2395-0056. Available: https://www.irjet.net/archives/V2/i7/IRJET- V2I780.pd

[7.] NA Syed (2019). "Fashion Merchandising: an Au

[8.] Bonetti, Francesca and Warnaby, Gary and Quinn, Lee (2018). Augmented Reality and Virtual Reality in Physical and Online Retailing: A Review, Synthesis and Research Agenda

[9.] Deepak Uplaonkar, Saurabh Saoji, "Virtual Furniture Application Using Augmented Reality", IJARCST, Vol.3, issue 1(Jan.-Mar.2015), pp. 156-160.

[10.] Amirian, Pouria and Basiri, AnahidLandmark-Based Pedestrian Navigation Using Augmented Reality and Machine Learning.

[11.] Yim, Mark Yi-Cheon and Chu, Shu-Chuan and Sauer, Paul L. (2017). Is Augmented Reality Technology an Effective Tool for E-commerce? An Interactivity and Vividness Perspective. 39,

[12.] Wang, Chao-Hung and Chiang, Yi-Chen and Wang, Mao-Jiun (2015). Evaluation of an Augmented Reality Embedded O-line ShoppingSystem 3,

[13.] Rese, Alexandra and Baier, Daniel and Geyer-Schulz, Andreas and Schreiber, Stefanie (2017). How augmented reality apps are accepted by consumers: A comparative analysis using scales and opinions. 124,

[14.] Erra, Ugo and Colonnese, ValerioExperiences in the Development of an Augmented Reality Dressing Room.

[15.] Welivita, Anuradha and Nimalsiri, Nanduni and Wickramasinghe, Ruchiranga and Pathirana, Upekka and Gamage, ChandanaVirtual Product Try-On Solution for E-Commerce Using Mobile Augmented Reality.

[16.] Tim Hilken,Ko de Ruyter, Mathew Chylinski, Dominik Mahr, Debbie I. Keeling, (2017) Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences

[17.] Çadirci, T.O. and Köse, S.G.Augmented Reality as a tool to enhance the experiential value of online shopping: The future of fashion retailing. 2

[18.] http://www.augmented-minds.com/