**Virtual Try-on**

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**Abstract- The advancement of technology has had a significant impact on various industries, with innovative solutions like Cloud computing, IoT, Augmented reality, and Virtual reality changing the game in many ways. This paper presents a system known as "Virtual Try-ons" which leverages IoT devices like mobile cameras, Cloud storage for data, and an intelligent interface for user interaction. With more and more people opting for online shopping, there are various challenges that arise with this transition, one of which is the issue of "Try-on." Virtual Reality solves this challenge by introducing "Virtual Try-on" which replaces traditional try-on methods. With Virtual Try-on, individuals can preview and virtually try on their desired products like clothes, watches, shoes, etc., from the comfort of their own homes, making the shopping experience easier and smoother. Virtual try-on also adds an element of fun and excitement to the shopping experience, increasing the hedonic value for consumers. It allows consumers to experiment and play with different products, styles, and colors, in a way that is not possible with traditional shopping methods.**

Key words: Augmented reality, Cloud computing, Hedonic value, IoT, Try-on, Virtual reality, Virtual try-on.

**1. Introduction:**

"Virtual Try-on" is a cloud-based web application that enables users to virtually try on products such as dresses, watches, shoes, earrings. This system was created using Snapchat's Lens Studio. The products are readily available to users in the form of snap codes that direct them to the lenses in Snapchat. Both sellers and buyers benefit from this system as it makes it easy for sellers to design and publish their product as a lens. Sellers can easily track the success of their product design using the Snapchat dashboard, which displays information such as the number of users and rank of the lens. Once published, the lenses are stored in the cloud and accessible to all users. Buyers can easily try on products using just their mobile camera, eliminating the need to visit physical stores. This technology can enhance the customer experience, leading to increased satisfaction, higher conversion rates, repeat customers, and positive word-of-mouth marketing. Moreover, virtual try-on can help to lower the costs associated with returns and exchanges, which can be a significant expense for online retailers.

**2. Literature survey**

Aakash Tyagi [1] has defined Cloud Computing as providing on demand resources such as network, storage, server through internet. The paper provides a overview of Cloud Computing besides focusing on key computing issues such as access to servers & applications, virtual machine security, network security, data security, data privacy, data Integrity, data location, data availability, data segregation, security policy and compliance and patch management. The author identified Service Level Agreements (SLA’s), cloud data management & security, data encryption, migration of virtual machines, interoperability, access controls, energy management, platform management as key research challenges in clod computing.

Abdel Rahman H. Hussein [2] discussed the influence of the Internet of Things (IoT) in various industries and how it operates. According to the author, IoT is a network of physical objects with varying levels of computational power, sensing capabilities, and the ability to actuate, all of which can communicate with each other through the internet. These interconnected devices are useful in creating smart cities, improving healthcare, optimizing agriculture and water management, revolutionizing retail and logistics, enhancing daily life, and promoting a smart environment. Despite its benefits, there are still research challenges related to privacy and security, data processing and management, monitoring and sensing, machine-to-machine communication, and interoperability.

Dov Schafer and David Kaufman [3] highlighted the significance of intelligent interfaces for Augmented Reality (AR) applications. They explained the origin of the term "Augmented Reality." The authors also discussed a framework known as Pose-Interfaced Presentation (PIP), which is an intelligent interface that combines digital objects in a real-world context. PIP refers to the user's location and orientation in space (Pose), the program's response to the user's actions and intentions in an intelligent manner (Interfaced), and the virtual objects or data being layered onto the user's perceptual field (Presentation). The authors noted that AR is useful for activities such as learning, worker training, and language learning.

Sangeeta Kumari, Nitish Polke [4] have mentioned that in 2016 a report by Digi-Capital’s Augmented/Virtual Realty (AR/VR), deals database which totalizes to $686 million of Augmented and Virtual Reality during 2015 and just in ﬁrst quarter of 2016 it totalizes to $1.2 billion. According to Goldman Sachs 2016 AR/VR survey the estimate of these two technologies in a worst-case scenario is being done. They estimated that Augmented Reality and Virtual Reality will become an $80 billion market. They also estimated that if Augmented Reality grows in an accelerated uptake rate and hits the market them the market might grow to $182 billion by the year 2020. This paper lists various applications of AR-VR in different domains like gaming, education, health care etc. And gives a brief comparative analysis of AR/VR products. It mainly focuses on the implementation issues such as requirement of dedicated hardware, need of cheaper technology, lack of legitimate use cases, mobility problem/miniaturization issues, low concern about the security. The authors hope that AR-VR can be intersected with IoT, AI, ML, 5G to result in some useful products.

Anuradha Yadav [5] conducted a survey of 100 respondents, including students from various colleges and salaried individuals. Many of these respondents were younger individuals. The study found that 70% of the sample population agreed that augmented reality (AR) has an influence on purchase intention and that social media has an impact on online shopping. Respondents reported experiencing AR on Instagram, Snapchat, and a few on Facebook. More than half of the respondents agreed that AR is a unique and exciting way to engage customers on social media, and that it creates a more engaging experience than other forms of advertising. The study also found that AR can help generate positive word of mouth and that soon, social media content will upgrade from 2D to 3D, powered by AR including interactive AR.

Ruggero Eugeni [6], the author of this paper studies the technology of augmented reality filters (ARF), which enables the creation and widespread sharing of video selfies on social media. It explores the technical aspects, as well as the socio-psychological and economic-political implications of ARF, including their link to face recognition and social surveillance. The study explains that ARF functions at three levels: the technological level of devices, the social and micro-social level of assemblages, and the general mechanisms of political economy of apparatuses. It also explains how the technology of ARF allows for the modification of facial expressions in videos and how certain platforms like Instagram have restricted their use due to concerns of "Snapchat dysmorphia" and the manipulation of identity and reputation through technology-based enunciation procedures.

Pontus Hedman, Vasilios Skepetzis, Kevin Hernandez-Diaz, Josef Bigun,Fernando Alonso-Fernandez [7] investigated the effect of social media filters on the accuracy of face identification and recognition. The study focuses on how filters that alter or obscure the eye region can have negative impacts on these tasks. A combination of two approaches was used to neutralize the effects of most of the analyzed photo alterations. A modified U-NET segmentation network was used to create a mechanism for undoing the applied alterations and improving face detection and identification. The study particularly explores the effects of AR filters, which are not commonly researched in literature. The study enhances photographs with popular Instagram filters, mostly affecting contrast and lighting, and replicates them using a neural network to process large amounts of data. AR filters were also used and were found to obscure important parts of the face for recognition, like dog nose, transparent glasses, and sunglasses. The study uses five datasets of Labelled Faces in the Wild that were created by using Instagram and AR filters and categorizes them into "shades leak" and "no leak" categories.

Rebecca Fribourg, Etienne Peillard, Rachel Mcdonnell [8] examined the impact of AR filters on the self-perception of personality, intelligence, emotion, and attractiveness using the first study of its kind. Our research shows that individuals perceive facial characteristics similarly in themselves and others. Furthermore, even small changes in facial features had a significant impact on participants' ability to recognize themselves, highlighting the importance people place on faces, particularly their own appearance. The study evaluates the effects of various filters that change facial traits such as eye size and placement, face shape, and brow orientation and includes virtual content like virtual glasses. Participants were asked to rate their altered face on personality, emotion, appeal, and intellectual attributes. The results indicate that certain filters had a greater impact on self-perception than others. Previous research has found that specific facial traits have a significant impact on the perception of attractiveness, intelligence, and personality in others. However, this study is unique in that it focuses on the relationship between self-facial features and self-perception of personality traits.

Maisevli Harika, Setiadi Rachmat, Nurul Dewi Aulia, Zulfa Audina Dwi, Vandha Pradwiyasma Widartha [9] presented an augmented reality application for social media makeup filters using HSV color extraction, which allows users to apply digital makeup to their face with a single finger or similar device. The approach allows for more accurate representation of makeup on social media; however, its processing large amounts of data is not feasible with the Instagram Application Programming Interface. The goal is to create an Instagram filter-based augmented reality virtual makeup simulation that can be used by people of all ages, applied to stories, reels or live video. This simulation uses the HSV color extraction technique to select colors based on hue, saturation and value to identify faces and match foundation and lipstick shades to the user's skin tone. This allows users to test cosmetics based on their preferred hue in different lighting settings through the use of social media and augmented reality, making it easier for customers to select cosmetics while also providing feedback on their color choices. This work demonstrates that augmented reality apps can be useful in displaying filters in various lighting conditions and with further advancements in technology, augmented reality and virtual reality can be increasingly used to address similar issues.

Ana Javornik, Ben Marde, Marta Pizzetti, Luk Warlop [10] investigated the impact of sensory experiences, specifically the use of an augmented reality mirror, on a person's perception of their own attractiveness. The results of three experiments reveal that viewing oneself in an AR mirror changes the gap between a person's actual and ideal attractiveness, and this effect varies based on their self-esteem. According to the author, the augmented self goes beyond just makeup and can be applied in various ways, such as through AR face filters on social media and AR clothes try-on in the fashion industry. There is potential to examine how these technologies may change the way we interact with ourselves and others and provide more insight into the concept of the augmented self.

Aline de Fatima Soares Borges, Carlos H. Morimoto [11] introduced an augmented reality system that allows users to apply virtual makeup to their face using a finger or similar object. It features a user interface that allows them to choose products and other features during interaction. The prototype, which runs in real-time, can simulate the application of foundation, blush, and eyeshadow using an Intel RealSense RGBD camera to capture color and depth images. The user's face and 91 facial landmarks are tracked and mapped to a normalized facial space that is invariant to facial motion and expressions, which is used to store the virtual makeup applied to the face. The system also includes an accurate, real-time face touch detection algorithm that tracks the finger and face in depth images and detects touch events when the distance between them falls below a threshold. The touch is mapped to one or more triangles that update their state with the current active makeup texture, and the face is rendered with virtual makeup by back-projecting the facial mesh and combining it with the makeup texture using tracked facial landmarks.

Marc Ria, Jakob J. Korbe, Nannan Xi, Rüdiger Zarnekow and Juho Hamari [12] aimed at reviewing and reporting how and where the AR technology is used in retail and focuses on the effects of using AR in retail. The primary benefit of online solutions is the ability to test products in any environment and assist customers in making purchase decisions. Typically, the participants were invited to view themselves in a scenario using an AR application, which they subsequently controlled using a computer. In some of these systems, participants can also see themselves in virtual mirrors and virtually try on various (for example, fashion) items. It says that AR in retail involves environments like online web-based, in-store etc., devices like hand-based mobile device, desktop pc, virtual mirror etc., and it is dominantly used in clothing, furniture, make-up, technology related industries. From an affective standpoint, hedonic value, or enjoyment, has been most prevalent that has been evaluated (52% of the research encountered it). It was discovered that the presence of and interaction with AR can improve the hedonic experience (such as enjoyment, fun, amusement, and playfulness) in shops or retailing apps. It states that Additionally, AR-based retail can affect various social dimensions and psychological states (mainly personality related). According to this paper, user perceptions of usability, perceived value, cognitive fluency, attitudes toward products, and brand engagement can all be improved by affordances related to interaction. It points that augmented environment plays a vital characteristic of AR in retail. Like interactivity and vividness, novelty gives a high perception of enjoyment, fullness, and brand engagement.

Rosy Boardman, Claudia Henninger [13] focused on the technical advancements that are currently being utilized in the fashion industry, specifically focusing on the utilization of Augmented Reality (AR) and Virtual Reality (VR) technology. With the development of more advanced technology, these interactive technologies are becoming increasingly popular in the fashion retail sector, as they have the potential to create unique and immersive shopping experiences. These technologies, classified as "consumer-facing," have gained significant attention from retailers, with predictions of widespread adoption across various industries including fashion. For retail stores looking to increase their sales, investing in technology such as AR and VR is becoming a necessary and viable option. Technology Acceptance Model (TAM) can help retailers understand how and why consumers may accept or reject the use of specific technology and ultimately make informed decisions on investments in emerging technologies like AR and VR. In the future, it is expected that technology investment, particularly in AR and VR, will be crucial for retail establishments to stay competitive.

Navneet Garg , Ankita Pareek , Ajinkya Lale, S K Jagannath Charya [14] say, Augmented reality can be used to help customers make informed decisions when shopping for products. By providing information such as reviews and related items, retailers can persuade their target audience to make a purchase. Additionally, AR can provide an in-store shopping experience by superimposing 3D objects in different spaces, allowing customers to interact with virtual products in their own environment. In today's market, with more products and shorter runs, AR can help businesses stand out and make faster, more effective decisions based on customer needs. In the future, a dynamic framework including various stakeholders such as users, professionals, and entrepreneurs could be used to simulate and study responses to hypothetical situations for various desired objectives.

Shreya Kalmkar, Afrin Mujawar, Dr. Kazi Kutubuddin Sayyad Liyakat [15] showed that the use of augmented reality (AR) in social networks and on various devices is expected to continue increasing in the United States. eMarketer predicts that 43 million Americans will use social network AR at least once a month by 2020, comprising 21% of all social network users. Additionally, 83 million individuals in the US are expected to use AR on some type of device at least once a month, with this figure projected to rise to 95.1 million by 2022. By June 2020, 35% of Americans had used AR to visualize furniture or automobile upgrades, and a poll of US merchants found that 20% planned to invest in AR for their company's online store, up from 8% six months prior. According to the author, using 3D technology and understanding current trends in the ecommerce industry can improve product demonstrations, streamline product adaptations, and increase customer retention. 3D technology can also increase consumer confidence, allow customers to view products in interactive 3D before purchasing, encourage upselling and cross-selling, and reduce high return rates for ecommerce products. Marketing strategies using 3D visualization and rendering can help take an ecommerce business to the next level of success.

Ruiyun Yu, Xiaoqi Wang, Xiaohui Xie [16] presented a new method for image-based virtual reality applications that generates more realistic looking virtual try-on images than current state- of-the-art methods. The method, called the Virtual Try-on Network with Feature Propagation (VTNFP), introduces several innovations to improve the quality of image synthesis. A key innovation of VTNFP is the body segmentation map prediction, which provides important information for guiding image synthesis in areas where body parts and clothing intersect. The input and output images are all fixed to 256x192 in size, and the Adam optimizer is used with a learning rate that decreases linearly over time. Non- local layers are added to the Try-on Synthesis Module, and the training steps, optimizer, and learning rate settings are the same as those used in clothing deformation. It was found that VTNFP is significantly superior to previous methods.

Rishabh Jain, Abhishek, Param Chauhan, Apoorvi Sood [17] aimed to understand how virtual reality technology is being used in clothing, specifically by examining the use of 2D and 3D techniques. The study seeks to identify strategies and methods that can be applied to create a more advanced virtual try-on system. Survey data revealed that 44% of respondents used virtual try-on when shopping on retail websites, and as a result, 69% of those surveyed said they purchased the items from a store or online. Virtual try-on allows customers to preview how clothing will look on them before making a purchase. However, there is currently a lack of information on how to integrate virtual try-on technology with anthropometric data to provide an even more accurate representation of how clothing will look and fit on an individual. Previous studies have developed techniques for extracting measures, identifying body traits, and building 3D models from 2D images, as well as methods for optimizing silhouettes.

Ruchi Gupta, Kiran S [18] Nair aimed to examine the efficacy of augmented reality in the production of sensory brand experience and intention to use the mobile app with an integrated AR feature. The core data came from 168 respondents who were compelled to use the augmented reality (AR) feature of the Lenskart mobile app, an Indian eyeglasses e-commerce site, to try on numerous eyeglass and sunglass frames to determine which one best suited their looks. Structural equation modelling was used to investigate the influence in question. The development of sensory brand experiences and the intention to use the augmented reality function of the mobile app are highly impacted by effective augmented reality use, according to the findings. The study was to answer the following questions:

Q1: Does the intention to use a mobile app change as a result of an AR feature included in the app?

Q2: Is it possible to give users of a mobile app with augmented reality (AR) a sensory brand experience?

Q3: How does sensory brand experience influence the likelihood that a user will utilize an app?

Q4: What impact do perceived usefulness (PU), perceived ease of use (PEOU), perceived enjoyment (PE), and flow experience (FE) have on the sensory brand experience and the decision to use the mobile app?

The paper thoroughly studies how the AR try-on is implemented in lenskart. This paper concludes that in the near future, AR-enabled mobile apps will become increasingly prevalent.

Adrian Samuel, Dr. S. Senith [19] aimed to explore the importance, challenges, and factors of Augmented Reality (AR) in the retail industry. AR has the potential to improve the customer experience and make purchasing decisions easier, thereby attracting more customers to the store and increasing sales and profits. However, retailers must also be aware of the potential for confusion if no guidance is provided for customers using AR technology. Combining AR with mobile shopping can provide a more enhanced shopping experience. AR can also be beneficial in other sectors, such as academia, medical, and tourism. Retailers should consider the type of virtual fitting room that would be engaging and practical for their target customers. AR can also potentially replace traditional fitting rooms and enhance the emotional response of customers, leading to greater buying intention. Additionally, AR enabled e-commerce can enhance the buying efficiency and satisfaction. AR dominates internet-based product presentations by providing greater interaction and making it easier for buyers to decide by eliminating confusion over which products to choose. Overall, AR has the potential to transform the retail experience by adding flexibility and convenience to the shopping process.

Piyush Anand, Raj Gupta, Nikhil Kumar Tiwari , Shilpy Gupta [20] stated that virtual try-on is a say comparatively faster than the traditional physical try-ons. It ensures a speedy process by providing the customers with the chance to try-on hundreds of choices instead of going to physical stores. Glass virtual try-on needs an uploaded image of the customer and the name of the frame. The rest of the process is automated. It lists out the features of this system as Real-time web-based glasses tried, Light reconstruction (ambient + directing), very strong in lighting conditions, Mobile friendly, Advanced 3D Engine, Body-based delivery (PBR), Sequential shadows, Default blur. It says that face recognition is the pre-requisite for the visual experiment system. A brief explanation of the face recognition process is being a part of this paper.

Omkar Jadhav, Anish Patil, Jeffy Sam , and Kiruthika M [21] aimed to improve the online shopping experience for users by utilizing augmented reality technology. It suggests integrating the technology with various fashion and e-commerce websites to allow users to view real-time simulations of clothing without physically trying them on. By automatically converting 2D images into 3D models, the system aims to provide a more accurate evaluation of clothing. Using the Pix2Surf and PIFu methods, the system can transfer textures from clothing images onto 3D human models and create a complete 3D geometric structure from a single image respectively. It also helps users to map textures from a wide range of garments available on online sites. Overall, this technology aims to overcome the challenges users face when shopping online by providing them with a more realistic and immersive shopping experience.

Dr.K. HelenPrabha, R. Ramyalakshmi, K. Renuka Devi, P. Sadhurya [22] said “customers are nevertheless unhappy with the goods being delivered, due to the fact of the colour or length mismatches of the product delivered in online shopping.”. VR in e-commerce is used to provide a new shopping experience to customers by allowing them to control 3D virtual models online. Unlike VR, which experientially replaces the physical world, AR enhances physical reality by integrating virtual objects into a physical scene. Generated virtual objects become, in a sense, an equal part of the natural environment. The existing system contains a Modular Smart Mirror Application, From 2D Photos of Yourself to Virtual Try-On Dress on the Web. The proposed system of the authors uses Face Tracking technology to place the developed Garment model on the user. The proposed system is developed using Unity. Their future development may contain various products and accessories to try-on.

T. Senthil Kumar [23] aims to establish a foundation for future work in the field of retail applications that employ virtual and augmented reality (AR) technologies. AR allows for the combination of a user's physical view with digital information in a single environment, and it is becoming increasingly popular in the retail industry. The document reviews recent advances in AR in the retail industry and suggests future research areas to bridge the research gap. Google trends data shows a steady interest in terms such as virtual reality, augmented reality, and online shopping over the past five years. The benefits of using AR/VR technology in e-commerce have been shown through virtual 3D modelling, virtual apparel, haptic gloves and product images that provide visual appeal for online shoppers. Previous research has examined both the hardware and the user experiences related to VR/AR technology in the retail context. However, more attention needs to be given to the regulatory, affordability, acceptability, privacy, and other potential barriers to consumer adoption of VR and AR technology in retail applications.

**4. Materials and Methods:**

The proposed work can be segregated as three sub tasks:

1.

2.

3.

* 1. **Generating the lens:**

Lens studio is the software used to create lenses. The important task is to track different body parts for different accessories. 3D body tracking refers to the process of estimating the position and orientation of the human body in 3D space. It involves a combination of computer vision and image processing techniques. One common approach is to use object detection algorithms, such as Faster R-CNN or YOLO, to detect and track the body parts of the user in real-time. Once detected, it is then possible to perform body tracking and animation using inverse kinematics (IK). IK is a technique used to animate characters or objects in a way that mimics real-world motion by solving for the motion of bones in a skeleton based on the position of the end effector (in this case, the cloth) and the constraints of the system. Another important term is Occlusion. Occlusion refers to the process of determining which parts of virtual objects in an augmented reality scene should be hidden or obscured by real-world objects. Occlusion in Lens Studio is typically achieved using a process called depth mapping. Depth mapping involves capturing the distance of each pixel in the camera view to the camera itself, creating a depth map of the scene. This depth map can then be used to determine which objects are in front of other objects, and which parts of the objects should be occluded or hidden. Generating lens is further divided into five sub tasks. They are:

* + 1. **Garment transfer:**

Garment transfer is a custom component in lens Studio that helps by transferring an upper body costume of an image onto a person in real world. It contains three main components:

Garment transfer custom component:

It handles how the costume on a reference image is transferred on to a person. It takes auto run, target image and garment image as inputs. When auto run is enabled, the component runs every frame and gives real time video experience but when disabled the component runs manually from a script. The target image is the person in real time captured through the camera onto whom the garment is transferred. The garment image is a reference image from where the garment is transferred. Adding garment transfer is done in four easy steps.

Carousel:

The carousel component is used to switch between different garments easily just by tapping. Adding, removing, and modifying of the garments is done by modifying the icon list in inspector panel.

GTController:

The GTCController.js controls the following functions:

Allows switching between different run modes, set the garment image in the Garment Transfer custom component when a new garment is selected in the carousel, implement Run on Tap mode interaction and call Garment Transfer API to process the garment once on tap.

The process is as follows:  
1. Install garment transfer custom component from asset library.  
2. Create a ScreenTransform object from the Objects panel.  
3. Add the Garment Transfer component to the newly created SceneObject.  
4. Set the Garment Image input to a reference garment image of your liking.

* + 1. **Wristwear try-on:**

It mainly requires three components:

Wrist tracking scene object:

The functionality of this object is to track the wrist. For this, wrist tracking custom component and wrist occluder is installed from the asset library.

The left and right wrist objects:

It contains all the details related to the wrists.

The 3D models:

These are the models for try-on.

The process follows the steps provided below:  
1. Right click on the camera object in the left panel and select create scene object.  
2. Rename the scene object as wrist tracking custom component.  
3. Right click on the wrist tracking custom component and create two scene objects and rename them as left wrist and right wrist.  
4. Click on the wrist tracking custom component scene object and click “+Add Component” in the inspector panel.  
5. Add the wrist tracking to the scene object.  
6. Click and drag left and right wrist scene objects from object panel to the inspector panel.  
7. Click and drag Wrist\_Occluder\_\_PLACE\_UNDER\_WRIST\_TRACKING\_CC asset to the objects panel.  
8. Make sure that Left Wrist Occluder is a child of Left wrist scene object and Right Wrist Occlude ria child of Right wrist.  
9. Now import the 3D model in the object panels in the Left and Right wrists.  
10. Adjust the positions, rotation, and scale of models in the inspector panel on the right.

* + 1. **Footwear try-on:**

It contains three main components:

Foot Tracking:

This component is used in the process of attaching and tracking shoes to a user’s feet.

Carousel:

This component is used to switch between multiple shoe designs.

Shoe Controller script:

This script contains the main logic to tie carousel to the foot tracking components.

The process follows the below steps:  
1. Install Foot Tracking component from asset library in Lens Studio.  
2. Create a new Scene object under camera.  
3. On the left side, click on “+Add Component” and select Foot Tracking in the inspector panel.  
4. Add left and right foot Objects in the component.  
5. Import the 3D models in the left and right foot objects.  
6. Adjust the position, rotation and scale of the 3D models so that it can fit the foot properly.  
7. Add Default Occluder on in the Foot Tracking Component to handle the occlusion.

* + 1. **Earring Try-on:**

Ear Binding is the main component of earring try on. It is attached to an ear landmark which determines the position of the ear like Lobe-front, Lobe-back, helix etc.

The procedure is as follows:  
1. Install Ear Binding component from the asset library.  
2. Go to the project and add a Scene object under the main camera and name the object as Earring.  
3. Select the Scene Object and click on “+Add Component” in the inspector panel and add Ear Binding.  
4. import the 3D model of the earring under the hierarchy of the Earring Scene Object.  
5. Adjust the position, rotation, scale of the model according to the preferences.

* + 1. **Cloth Simulation try-on:**

Cloth Simulation try-on uses 3D Body Tracking, Cloth Simulation and Body mesh technologies. 3D Body tracking is used to track the person. Clothes are conformed on the body using Body mesh, Cloth Simulation is used to deform the clothes based on the movement of the body.  
The process is as follows:  
1. Install 3D body tracking from asset library and add it to main camera.  
2. Add the 3D model under the hierarchy of the camera.  
3. It is noticed that there are Attachment points which has a list of body parts and a guide object.  
4. These objects are used to prevent overlapping of clothes.  
5. Collider Guides object are objects to which the object Tracking 3D component is aligning to the body.  
6. Full Body Occluder component uses Body Mesh which hide the part of the clothes covered by human body.  
7. To pin the dress to body mesh, we use vertex colors to indicate which parts of the dress are binded, and which are simulated.

* 1. **Publishing the lens:**

To publish the lens, firstly it is required to configure the project. Open the Project Info settings window and provide the required details like lens icon, lens preview, lens name, size, camera option. After all the changes click apply. Once done with this go to the project and click the Publish lens button. It asks you to log onto Snapchat with username and password. Next it prompts to authorize Lens Studio by clicking authorize button. Click Continue on the Back to App prompt. It prompts us to add information about the lens which includes lens tags, scan triggers, visibility. Click Submit Lens once done with the previous step. It enters review status and takes time to get reviewed and goes public after the review. The status of the published lenses can be viewed in My lenses portal which is a part of lens Studio project window. My Lens portal is a dashboard containing all the lenses and related information belonging to the respective user.

* 1. **Hosting the website:**

For hosting the website on cloud, Amazon Web Services (<https://aws.amazon.com/>) is used.

Steps to be followed:  
1. Go to Services and search for elastic beanstalk.  
2. Click create application and name the app, and select the platform.  
3. Upload zip folder of the app in Appication code and click create application.  
4. Copy the url from elastic beanstalk->Environments.  
5. Paste the url in the browser to check whether it is working.

**5. Results and analysis:**

 A picture containing icon

Description automatically generated 

Icon

Description automatically generated A picture containing icon

Description automatically generated 

**Figure 1.**

**6. Conclusion:**

This paper explores the significance of Virtual try-on in e-commerce, which streamlines the purchasing decision and elevates the customer experience. This is achieved by utilizing IoT devices such as smartphones, webcams, or other cameras. The intelligent interface, typically in the form of a website, provides various try-ons for products such as clothing and footwear via snap codes which are simple to scan. Currently, the options are limited, but the goal is to expand the offering to include more accessories like makeup and to provide a wider range of models for existing try-ons in the future.

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