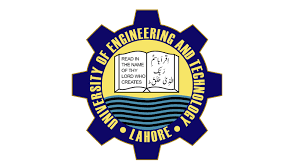
**Virtual Reality Based E-commerce Web Application**

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**Literature Survey**

**Literature Review**

In this section, we are going to discuss virtual reality, applications that did work on eCommerce applications with VR, AR, and a comparison of different web applications.

**Virtual Reality**

Virtual Reality is the future and it's a 3D complete environment in which everything provides a real-time feeling. Virtual reality is a buzzword today and it is popular nowadays in the future the students can take lessons and classes in the virtual environment and companies like Amazon is also working on e-commerce virtual reality-based application. People can just wear a VR headset and in their home, they can go to virtual e-commerce stores, and explore mental health treatment. There are lots of applications of virtual reality like VR in fashion designing, mental health treatment, education, sports, military, medical training, etc.

**Difference between Virtual Reality and Augmented Reality**

No external AR headset is required for experiencing augmented reality while a VR headset is required for experiencing a virtual environment. In virtual reality, everything is virtual like objects in a virtual environment while Augmented reality augments the real-world scene. Snapchat uses augmented reality as when we open a Snapchat camera then Snapchat provides different filters in which we can different objects The filters in which Snapchat lens scans our face and the apply different cartoon shapes or filters or face changers etc. all is possible because of augmented reality.

**Existing Work**

We are living in an era where technology is evolving at a rapid pace and so is the traditional way of work or business. For example, On-site classes are slowly switching to online classes, cash-on-hand payment is slowly switching to online payment, manual Registration, reservations, booking, etc are also being switched to online, so technology has greatly affected our traditional tasks. Now, it is evolving to the virtual reality-based works to facilitate the users even more than before. The term “metaverse” has been on-trend in recent times. It is a concept in which people can collaborate and live their life virtually in the virtual world using VR headsets. So far it is in the initial stages but many single-purpose apps have already implemented this feature. In our relevant cases, many e-commerce and clothing stores have started working on this virtual try-before-you-buy feature. Usually, the try-before-you-buy technique is used by the customers when shopping physically but many stores such as [IKEA WALA] Ikea have started Kitchen virtual reality in which a person can walk freely and interact with the virtual kitchen using a VR headset. Virtual 3-D Kitchen items can be tested in this environment. They Also [Ikea ek aur] has launched a new augmented reality application that allows users to test their products in real-time. So far it can only be used with Apple technology(ARKit). The app automatically scales products based on the given environment with 98 percent accuracy.

The eCommerce websites like Amazon [1], Alibaba [2], AliExpress [3], Walmart [4], etc. and outwear websites like Zeitgeist [5], breakout [6] have traditional approaches like customers go on the websites and then see different product items and add to card method.

**Timberland’s magic mirror**[7], lemon, and orange created a virtual fitting room for Timberland. It an amazing like customers just have to come in front of the mirror and they will see themselves in different clothes without wearing those clothes. The mirror used Augmented reality. The customer just has to come in front of the screen (just like a mirror) and then it will click the customer picture and then on the screen, the customer will see himself/herself in different outwear. The customer can also change outfits like pent, shirts, shoes, etc. Another good thing is that at the end their picture with newly changed outfits will be saved and will be mailed to the customer as well.

**Burberry** [8] is one of the most famous websites for buying outfits. It provides and virtual store feature like the customers can just click on the Access Virtual Burberry store and then a virtual store will be opened on the browser where customer can move and when hover on the outfit like jacket then the detailed price description will be shown to the customer on the screen. If the customer wants to buy that product he/she just has to click on the buy option on the outfit and then another page will be open from where the customer can order the outfit after certain steps like payment method. Burberry launches a virtual interactive store that is a replica of its flagship Tokyo store.

**EBay**[9], Australia’s largest marketplace and retail alongside Myer provided the world’s first Virtual Reality Departmental Store. More than 50,000 products Myer products can be selected using an eBay sight search. VR departmental store connects to the eBay.com.au API which allows a range of Myer’s products and real-time details. According to the stakeholders, this showcases a department store that can bring the love of shopping to life across both physical and digital environments. For the working, the shopper selects its interested areas and category, and virtual products are shown as a suggestion in the virtual store. Products can be searched and virtually checked by holding it, the shopper can move quickly through different sections which makes the experience pleasing and more effective, they simply lock their eyes on a specific product to check out its specifications and details and in the same way hold their eyes on the ‘Add to basket’ for buying and payment.

**AUDI** [10] launched the ‘AUDI VR experience’ for the first dealership in Germany, the UK, and Spain with additional locations to follow. It lets customers use the VR headset and explore the digitally configured AUDI through a Virtual environment. Now the buyers can configure even the smallest of the details as a realistic view. Proper lighting, 360 view, and various models and environments are present in this technology.

**Mister Spex** [11] provides an amazing experience that you can see how different glass frames will look on you in the virtual mirror and this is all you can do in your home on the mister spex website.

**Sephora**[12] and **Loreal** [13] have introduced a mirror-like application in which a person can test the makeup toolkit accurately with the actual motive to make the person through AR and not with the conventional technique. Also, has its AR view called Amazon’s Augmented Reality experience in which different products can be viewed and seen virtually before you buy them, for the future they are planning for a proper virtual tour of their stores. This has made them profit as it enables them with ease and comfort and also the users love to have these experiences through 3D techniques. This virtual try before you buy is the reason why AR/VR is so far a success in the shopping industry.

**Current State of Art**

The following table shows the various applications of the augmented reality and virtual reality in the retail environment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Name** | **Category** | **Status** | **Function** |
| 1 | Yihaodian | AR Virtual Store | Online | Customers can buy in a shop on their mobile phones |
| 2 | IKEA | Catalog Application | Online | Customers can put different items like bags on furniture like tables, and sofas and the customer can experience how it will look like in the real world. |
| 3 | Lacoste | LCST Augmented Reality Retail Campaign | Online | Customers can try different shoes |
| 4 | Audi | VR Based Application | On-Site | Customers use the VR headset and explore the digitally configured AUDI through a Virtual environment |
| 5 | Converse | Shoe Sampler | Online | Virtually try on shoes Ar Application |
| 6 | Topshop | AR Mirror | In-Store | Virtually try-on outfits in-store |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Name** | **Category** | **Status** | **Function** |
| 7 | Sephora | AR-based application | Online | Customers can apply makeup and try different shades to use virtual artists on their mobile phones |
| **8** | **L’Oréal** | AR based application | Online | Customers can apply makeup and try different shades to use virtual artists on their mobile phones |
| 9 | Burberry | Virtual Store | Online | 3D Virtual store in which outfits are placed |
| 10 | Mister Spex | Virtual Mirror | Online | Customers can try different frames and find /her favorite model. |
| 11 | Timber Land | AR Magic mirror | In-Store | Customers can try different outfits when they will see themselves on the mirror screen. |
| 12 | Uniqlo | AR Mirror | In-Store | Customers can try clothes |
| 13 | Gapinc | AR based application | Online | Virtual Dressing rooms |

Table 1Current State of Art

**Research gap**

The previous eCommerce work never used any virtual stores or virtual environments in which different products were placed and customers can experience the outfits on them in virtual stores in their homes just by wearing VR headsets. In short, there is no current such a website that is having a virtual environment where customers can just come into the virtual store while wearing a VR headset and when a customer clicks on the dress he/she can see the avatars wearing the outfits like a jacket and the customer can also see the detailed information like different sizes of outfits (For example jackets). As to buying outwear customers have two options first one is to order online and the second one is to go to the mall or store to buy outwear. Another option is augmented reality like the customer just opens the camera and can try different outfits because of the augmented reality.

Another, the gap we found is that there are 2D images of outfits and the models wearing those outfits are also in 2D images instead of the 3D model. Like a 3D image in which a person wearing outfits and customers can see back and forth how actually outfit will look like when any person will wear it.

**Conclusion**

With the time companies are working on VR and AR how can they add virtual stores in their applications and focus on the user-friendly and interactive applications so that it will improve user experience and the customer retention that will help their application to be number one in the world.

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