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ENHANCED VIRTUAL FITTING ROOM

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Abstract: As the customer's experience in present fit-on rooms is considered as an essential part of the textile industry, these fit-on rooms play a huge role in the textile shops. It is quite an arduous method and generates problems like long queues, having to change clothes individually, privacy problems and wasting time. The proposed convolutional neural network-based Virtual Fit-on Room helps to prevent the above-mentioned problems. This product contains a TV screen, two web cameras, and a PC. It captures the customer's body by using two web cameras and displays the customer's dressed body. The combination of CNN in Deep learning and AR processes the body detection and generates the customer's dressed object. The application uses the stereo vision concept to get body measurements. The system detects customer age, gender, face type, and skin tones which are used to recommend cloth styles to customers. Another requirement of this system is customizing styles according to the customer requirements and suggests different styles of clothes. The system achieved 99% accuracy when suggesting different styles using FFNN. Customers can choose clothes for another person who does not physically appear with the customer in the textile shop. The expected output delivers the most realistic dressed object to the customer which allows the efficient customizations for the textile products according to customer requirements. This product can highly influence the textile and fashion industry. Therefore, this product is suitable to compete with other applications in the industry.

Key words: Virtual Fit-on Room, Fashion, Style, Convolution Neural Network, Augmented Reality.

I. INTRODUCTION

In recent years, with the rapid development of the technology, virtual reality has gradually become the trend of the times. With the rapid development of technology, the virtual fitting room technology has come into being, which is applied in both physical and online stores. For the online part, compared with the traditional offline shopping method, online shopping is not bound by time and space. However, for the clothing retail industry, different brands have different materials and sizes, and it is difficult for users to have accurate assessment and control of clothing sizes. Users can simply scan their body contours and input relevant body data to browse and try on their favorite clothes online. Online virtual fitting rooms provide a platform for users to quickly try on clothes, allowing consumers to get the right size of products in a short period of time. For the instore part, Offline users are able to experience convenient and fast virtual changing technology in physical stores, saving dressing time and improving shopping efficiency. At the same time, stores are able to reduce the cost of fitting rooms and gain more display and shopping space.Virtual fitting technology can not only significantly improve the efficiency of consumer purchases and greatly reduce the return rate, but also help companies grasp more user data, analyze this data to accurately recommend products for users, design new products based on demand, and reorganize promotion and marketing models, thus enabling brands to increase profits[1]. The virtual fitting room has attracted worldwide attention as a highly promising and mature online virtual fitting technology.

The use of technology in the field of fashion design is currently growing rapidly. The development of technology has become something interesting in technological progress. Of course, also in the world of fashion. Fashion is a popular term for clothing. Fitting room or fitting room in a clothing store is a room for customers who want to try on a garment. Fitting rooms or fitting rooms can only be found in offline stores, unlike in an online shop that only displays product photos in its catalog. Customers or potential buyers sometimes want to try clothes that are in an online store but the store does not have an offline store so customers or potential buyers cannot try on the clothes they want. This paper will discuss the Virtual Fitting Room. The scope of technology used in the field of fashion design is related to software and tools. Virtual fitting room, which means the application built is a web-based application that applies the concept of augmented reality to display clothing objects in 2D [1]. Augmented reality itself is a technology that combines two-dimensional and / or three-dimensional virtual objects into a real environment [1]. Also mentioned

Augmented reality (AR) is an interactive experience of the real world environment where objects that are in the real world are enhanced by computer-generated perception information, sometimes crossing various sensory modalities, including visual, auditory, haptic, somatosensory, and olfactory [2]. Virtual Reality (VR), the user's perception of reality is entirely based on virtual information [3]. In Augmented Reality (AR) users are given additional information generated by the computer which increases their perception of reality [4]. The purpose of writing this paper is to analyze some of the views of Virtual Fitting Room in the field of fashion design.

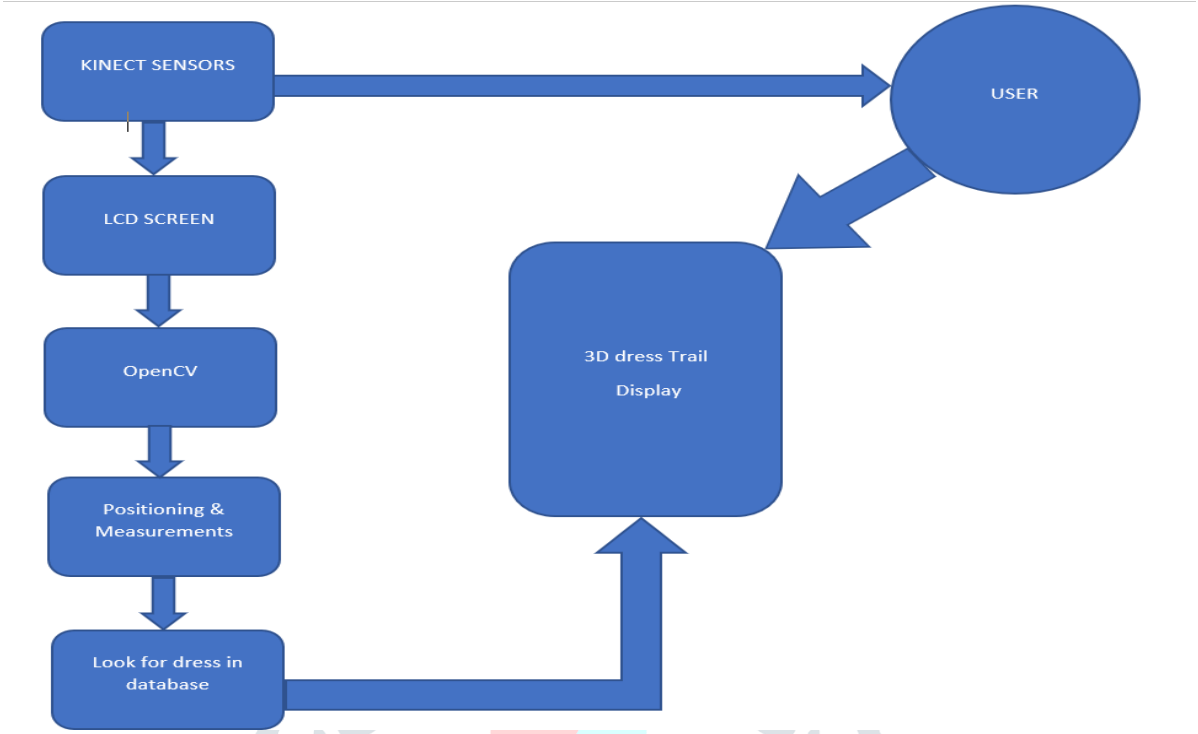

Figure 1: System Architecture

It normally takes a lot of time to try on things in a store. Additionally, in situations like internet purchasing, it might not even be able to try on clothing. By establishing a virtual changing room setting, we hope to improve accessibility and time efficiency for trying on clothing. The alignment of the user and the cloth models with precise location, scale, rotation, and ordering is the only issue. One of the first steps in solving the issue is identifying the user and their bodily parts. Several methods for body component detection and posture assessment have been put forth in the literature. Users of online shopping are better able to manage costs thanks to the use of web cameras.

Thus, the buying experience of today might significantly change as a result of this virtual trial room software. People don't need to be afraid of hidden cameras or stand in line in front of the trial room for hours to check out their clothes. Because using this only takes a few seconds, people can quickly change their attire or try on gowns. Here, the user saves a significant amount of time and exertion.

II. LITERATURE SURVEY

[1] This paper provides informative data about the age-related physical challenges and a randomized field experiment with 72 females aged 65+ was conducted using fitting room areas. This fitting room areas consist of two stores with different variety in levels of Universal Design features as well as services. This paper was fully based on ANCOVA: which is the fitting room accommodation. It implies on the importance of the fitting room area and it should never be underestimated by the people as it can be a necessity in the upcoming future and it can also lead to a great fitting environment.

[2] This paper emphasizes on the Madura Batik Virtual Fitting Room. It shows how Madura Batik Virtual Fitting Room has implemented their way of virtual dressing room. They have been using double difference algorithms motion detection. This virtual dressing room mainly consists of three stages i.e. motion detection, determining the region of interest of the detected motion and superimposing the virtual clothes over the region of interest. Motion Detection means detecting the surface of the body of hum being where the clothes are going to be placed and we must determine the region of interest and augment the cloth over the interested

region. In this build of Madura batik virtual fitting room, there is also an added feature of the Madura batik online stores: the consumer is able to see whether the clothes is fitted to them or not, and this paper consisting of virtual fitting room is written for the promotion of Madura batik broadly.

[3] This paper focuses on android application development of virtual fitting room for the exoticism of Madura batik in this app, the user will need to enter the following aspect that is given below: his/her weight and height and depending on that, we haveto create the models of the user. Also we need to create 3D models of the clothes in order to impose them on the user. So in this system, one of the problem was that if user don't know their exact measurements, then it could cause problem in fitting of clothes to that user. Also another problem with this proposed system was that user cannot still have the virtual experience of the clothes he/she selected.

[4] This paper shows the positive experience of using the dressing room in a retail store and considered it as a key part of the purchase decision process and a way to increase the profits. However, Poor atmosphere can have adversely bad effect on the shopping experience and it would result in lost of sales. Even though the importance of dressing room is increasing in the market, no proper studies have been done in this area and proper implementation could have lead to positive results [6]. Technology digital fitting rooms the latest in retail word link This paper talks about the latest trends of Virtual Dressing Room in real world and different ways of implementing them so that it can earn profits and the sales goes on increasing day by day. It also contains many facts regarding the number of increasing sales per year and how dressing room affects the total economy of the world.

[5] This paper tries to understand the methodological issues of user experience in wearing the clothes using an android app. It tries to understand the user experience in different technologies such as computer games, augmented reality and virtual environments which are reliable and valid concepts are needed for measuring relevant user reactions and their experiences. Here in this paper, they presented the approach of creating the both theoretically and methodologically sound methods for quantification of the rich user experience in different digital environments The main aim of their approach was to grasp the complex and multivariate nature of the experience and make it measurable so that it can be implemented .Mobile collaborative mixed reality for supporting scientific inquiry and visualization of earth science data This paper focuses on how to apply the emerging virtual and mixed reality techniques to visual exploration and visualization of data. With the help of this paper, a novel system has been developed in order to facilitate a collaborative mixed reality visualization, enabling both in- site and off-site users to simultaneously interact with each other and visualize the scientific data. It has also implemented the prototype system as per stated in the paper. And have reported out the current prototype effort along with their preliminary results.

III. PROPOSED METHODOLOGY

Virtual fitting room (VFR) technology, consumers can browse wider fashion collections and try to inventory in online channels. [5] The use of Virtual Fitting Room (VTR) presents a huge opportunity for the fashion industry by allowing consumers to try products virtually [6]. VFR is a technology that provides a virtual product trial experience through virtual model simulation based on consumer body measurements [7]. Using a webcam to visualize fitting rooms or fitting rooms, the application built is a web-based application that applies the concept of augmented reality to display clothing objects in 2D, and 3D where augmented reality is a technology that combines two-dimensional and or threedimensional virtual objects into an environment three-dimensional reality then project these virtual objects in real-time, with the final result of this application can be used to try out clothing and to change the size of clothes virtually [8]. Virtual Dressing Room application, the user interacts with the system to try and find an appropriate

clothing size. Virtual Dressing Room utilizes a webcam, Kinect camera technology to take measurements on the user's body and determine the size of clothing that is close to body size.

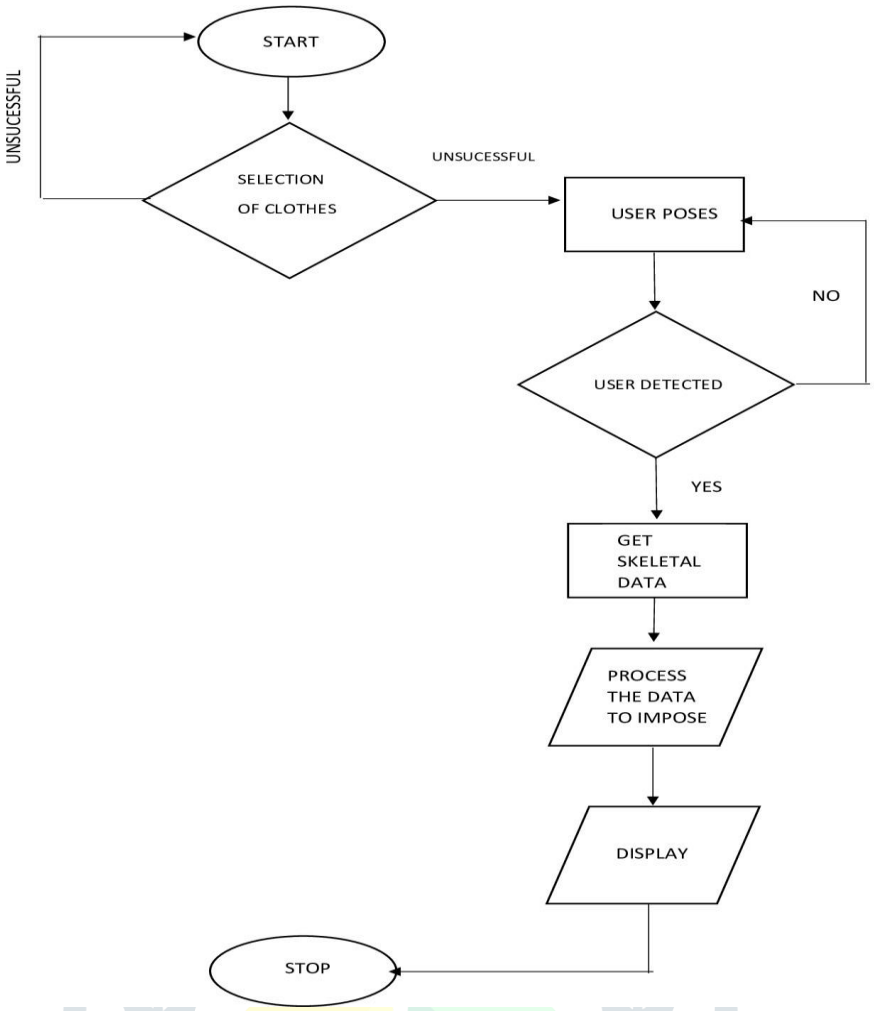

Figure 2: Control Flow Diagram

This project's primary goal is to improve and simplify the online buying experience for users. In order to save time, it seeks to develop an "Augmented Reality" fitting room. gives customers a way to try on different clothingwithout actually touching it before making a purchase. decreases the necessity for manual or physical clothingputting on, which also lowers the chance of contracting covid. It enables consumers to make wiser decisions. The project's primary goal is to create a genuine connection between the user and virtual clothing.

IV. RESULTS

Based on the results of data collection by authors sourced from journals, related articles and e-books, the following will describe the findings regarding the Virtual Fitting Room. Virtual fitting room provides movement-based interaction for users and suggests a variety of clothing. The main screen is divided into three parts (top, middle and bottom). The top section presents the logo of each store as well as menu options, such as language, gender, and clothing categories. The middle section is the actual AR area of the system, displaying real-time videos of users standing in front of the system wearing virtual clothes that are selected categories superimposed on their bodies. The bottom part consists of a Buy and

View Photos button. "Passport" is the code used as a unique identifier that gives access to an online html page that contains all of the user's preferred product.

Figure 3: results of virtual fitting room

Figure 4: results of virtual fitting room

V. CONCLUSION

This Virtual Fitting application can be developed from various sides. Starting from the development of learning media about fashion to the application in terms of business both in online stores, department stores, fashion houses, etc. Appearance in the Virtual Fitting Room can be in the form of 2-dimensional images, 3D dimensions, the use of a webcam, various fashion models of various sizes, all of which aim to make it easier for consumers to search for clothes. This is not without obstacles. Constraints related to the performance of the self / users in the virtual dressing room such as lack of understanding of the work flow, the compatibility between

the mirror / monitor with the body and clothes that were tried, also about the terms of textile, size and color. These constraints pose challenges to further development systems. They believe that they do not need to spend a lot of money on production and transportation. This advantage is also reflected in the process of reducing the return rate and return cost. In this regard, China can learn from the foreign spirit of innovation, and obtain a win-win situation for corporate growth and total revenue increasing through reasonable business logic and realization channels.

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