IMPACT OF AUGMENTED REALITY APPLICATIONS ON FASHION INDUSTRIES

Gunasekaran Muthumanickam*, Prakash V S**

*Professor, Department of Computer Science and Engineering, Saveetha School of Engineering
Saveetha Institute of Medical and Technical Sciences, Chennai – 602105, Tamilnadu, India
**Assistant Professor, Department of Computer Science, Kristu Jayanti College, Bengaluru – 560077, Karnataka, India

Abstract: Since the birthplace of humankind, there is a consistent quest for the thoughts and ideas that makes living simpler. This separates early men to that of the present individuals. Augmented Reality (AR) and Virtual Reality (VR) are two such ongoing advances that guide critical thinking with minimal utilization of manpower, making human carries on with simpler. These technologies likewise empower one to imitate genuine encounters without a ton of threat. Augmented Reality is the utilization of gadgets to perceive natural objectives and accomplish them with the utilization of machines. This can be of extraordinary use to discover an answer for any issue with simply an encounter and not in the legs of genuine peril. In this day and age execution of AR in the field of design should be possible by utilizing AR applications that give 3D models to take a stab at items that may improve the client shopping experience. By AR applications items can be examined to see how the items fit on a specific model. These applications can likewise be utilized to scan a customer to obtain measurements and plan items as per their desire. These ideas are the most current developments that may control the fashion industry completely.

Index Terms - Augmented Reality, AR Core, 3D Modeling, UI Design and Unity

I. INTRODUCTION

Augmented Reality is an arena that offers a wide range of Mixed Reality (MR) technology opportunities [1][2]. It is a technology where both virtual objects and real-world environments are merged. The virtual spaces are where real-world objects are deeply integrated into virtual worlds to generate new environment and analyses where digital and physical entities coexist and interact in significant-time. Such resources include storytelling (a way of visitors can learn and retain more knowledge about the 3D model, such as the cars they are exploring), gamified presence (an opportunity to keep them alert too) and much more[3][4][5]. AR technology fundamentally extends the perception of the true component of humans by integrating significant advanced information into a real environment. AR helps a consumer to work in a real-world situation. In the rational interpretation and gaming distraction, expanded reality conditions are fundamentally related [6][7][8]. The advantage of the implemented AR device in this project might provide investors with a quick and easy setup where even unqualified novices can easily capture the whole smart network. Using creative, compact and inexpensive interaction and exhibit tools, the AR functionality lets users to indulge them in a new reality that is reinforced by machine-based knowledge. The execution of AR as a new customer interface allows a totally new approach to the clothing stores [9][10][11]. Augmented Reality is a liberation mechanism that allows users to communicate telepathically such as scaling, rotating and changing color for a dress model and to be able to explore them while transporting their phones while walking in the world of reality[12][13]. The users can position the digital portal on a flat surface in the real world. This paper assists both the client and the service producer which allows the dealer to sell their product effectively and substantially [14][15].

In the innovative technological advancements, Augmented Reality applications are increasingly applied in a creative manner in the fashion industry. Moreover, they should be as purchasers' goodwill trying pieces of cloths preceding to get them - on the web or disconnected. This is made less difficult by applications that have features engaging virtual venture that make virtual fitting rooms; the open doors for experimentation is confined essentially by the imaginative mind[16]. To contact well informed buyers, brands are taking advantage of the internet shopping pattern with more current, online media agreeable, simple to-utilize applications on Mobile phones, Tablets and Personal digital assistants. Nowadays, Fashion industry brands are recognizing the impact of augmented reality how they can showcase and advertise their products. This paper proposes that virtual reality could potentially revolutionize shopping habits in the near future whether it is physical store, e-commerce or mobile commerce to enhance the customers shopping experience.

II. L ITERATURE SURVEY

De Paolis, L. T. et al. [2015][17] proposes that an AR experience for in- situ 3D model visualization, giving the opportunity to see conceived findings. The research was carried out in Chan Chan, the largest pre-Columbian city in America, for archeological purposes. Our mission at Chan Chan has been running since 2001, carrying on a wide range of research, preservation and mining activities. We propose an interesting workflow: acquisition of images, reconstruction of 3D photogrammetric, simplification of 3D, visualization of AR. Here is also provided a knowledge base applicable to archeological sites.

El Sayed, N. et. al [2010][18] used Augmented Reality Student Card for education purpose which uses single static markers combined in one card to assign different objects, leaving the choice of minimizing the tracking process to the computer application. This card has been designed to serve the educational field as a useful low-cost solution and represents any lesson in a 3D format that helps students visualize the facts, interact with theories, and handle the information in a completely new, effective and interactive manner. This card can be used with seven markers in offline, digital or game applications, four of which are used as a game controller for joysticks.

Juan, C. et. al [2008][19] proposed that the augmented reality system for learning the human body's interior which tests the system with children at the Technical University of Valencia's Summer School. The useful examination in this study is whether the use of a Head-Mounted Display or a standard screen affects the children's experience. Studies do not provide statistically important differences using both visualization models and suggest that children enjoy learning with the device and see it as a useful tool not only for understanding the human body's interior, but also for studying other subjects.

Poupyrev, I. et. al [2002][3] proposed that an AR interface so rich in interactivity that would merge the physical space where we live in and work with the virtual space where we store and interact with digital information. In this single enlarged space, computer-generated entities would become the physical environment's first-class citizens. Interaction would then be intuitive and smooth as we would deal with virtual and physical objects using the same resources. Tiles is an AR framework that explores this dream one step closer.

Hull, J. et. al [2007][20] proposed that a new method for through paper documents with electronic information that does not change the paper document format in any way. Applicable to both professionally printed documents and PC-sourced documents, the paper-based augmented reality greatly improves the utility of paper. As well as, we explain the recognition technology that makes this possible. An interface that allows users to retrieve information and access connections from paper documents to electronic data is addressed on a camera phone.

Jonna, H. et. al [21] highlights that while designing wearable computing garments, the visual design is very significant for suitability, and that a user's personal style mainly dictates their choice for the idea and willingness to wear the garment. Wearable AR markers were considered as suitable for wearing in social situations, such as parties or events, and as a tool for group cohesion or for showing campaign or ideological information.

III. PROPOSED METHODOLOGY

A. Constructing 3D Mannequin Model in Blender

Blender consists of 3D rectangle, camera, and light (top view). The solid form is seen as an essential question of work which gives us something to take on a gander. One of the solid focuses of the blender is the ability of its software to identify a few traditional kinds of 3-D records from different projects. Light is about lighting the scene, and the camera is about revealing the scene. Fig 1 is the simulation of the mannequin. Next, by using 3D shapes such as a sphere, cube, and plane, we create a 3D mannequin in a blender. To make it attractive, add right textures. Ultimately, as an OBJ file, it has been exported.

B. Unity Engine

Unity is a motor that is used to create 3-D players. It allows 3-D graphics in the right way. It is used to build a scalable framework that can be designed with the same codebase for multiple platforms. It gives the particle effects to look real. This helps build in the engine of physics. It has so many characteristics. Through harmony, we can also do animations. Various platforms such as Linux, Mac, Windows, iOS, Android and WebGL can be released using unity. Unity also enables users to select their choice of a graphics API such as DirectX9, DirectX11, DirectX12, Vulkan, OpenGL ES 2.O, Metal, OpenGL ES 3.O, WebGL 1.0, WebGL 2.0. Unity uses C# for internal and logical files. Complete toolset intuitive workspace and features for unit testing and editing on fly play allow the developer to save time and effort.

C.ARCore SDK

Google pretty much invented a glimpse of its new expanded AR Core toolbox. Of Android devices, the consumer development system is for structuring an AR-based app, amusements, and so on. Not at all like its predecessor Tango, to make extended experiences with reality, does AR Core not need any specific equipment gadgets with sensors. There are three techniques have been used in AR Core platform is ARCore's to combine the virtual things with the real world in order to get the immersive experience by the people for better experience are:

(i) Motion Tracking-Detect and track the global situation of the device.
(ii) Environmental Understanding-Using camera and gadget sensors to discern in detail the size, region, vital focus and highlights of genuine posts.
(iii) Light Estimation- provides an opportunity for the system to determine the overall light level.

Through observing the situation of the handheld gadget and using the camera and sensors in the cell phone to discern the edges, focus, surfaces and other essential highlights of the comprehensive environment, the AR toolkit understands this present reality encompassing the user. Using the information collected by AR Core, developers will build AR experiences that allow customers to position virtual items outside a genuine table, place a virtual character next to a genuine person, and so on. The following item motion gives the user the chance to move around and see from any edge the digital document.

D. UI Design

User Interface (UI) is all built to be a system of knowledge that a person can interact with. Graphical user interfaces are design control panels that include gesture-based interfaces that experience users interacting in 3D design spaces. Unity User Interface is used in this application to construct user experiences. We use UI features such as the Menu Panel and Game Panel in this program. There seem to be buttons like' ENTER' and' QUIT' on the men board. This includes buttons such as' RESTART," COLOR CHANGE' and' Home' in the Game table. The Fig. 1 shows the C# script used for changing the color of the model:

```
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.UI;

Public  class ColourChange : MonoBehaviour
{
  public Material material;
  public void ColorChangeButton()
  {
   Color newColor =      new Color(Random.value, Random.value,1.0f) renderer.material.color =  newColor;
  }
}
```

Fig. 1: Code for Changing Color of Model

E. Project Output

The final output of the project, open the 2018.4.1f1 update of Unity, which is considered to be stable and configure the AR Core SDK 1.10. Then render a script for analyzing the motion of 3D mannequins, scaling, changing colors and textures. The OBJ folder is inserted into the property of unity and added the 3D mannequin model scripts. Eventually, converted to an android app APK directory.

IV. E XPERIMENTAL RESULTS

A. UI Menu Panel

Start the application and see the panel of the interface. A UI button ' Select Model ' where you need to select the dress you need. When we choose the dress model, it goes to the AR scene immediately.

B. Ground Plane Detection

With the detection of feature points and plans ARCore continually improves its understanding of the real environment. The grid appears where the background has been found. The grid emerges. Touch the display allows the mannequin model to be placed on the ground plane.

C. Model Placement and manipulation

Touching the screen brings in the ground lane, mannequin and the dress model. We could scale it around, turn it around and see the configurations and designs of the dress.

D. Model Color Change

It is possible to change the color of the dress by using the Color palette in the settings icon. The Dress color changes by clicking ' RED. '

V. CONCLUSION

This paper addresses the omnipresent AR, which is a newly added principle in the field of clothing showroom revelation. This consists of continuous context-conscious support applied in an AR solution. The major part of implementation of this work is manipulation of 3D mannequin models, design vision, error and cost reduction, and ongoing support; whereas the primary obstacles are size, hardware problems, and development of applications. The proposed work is promising as it could provide the reduction of error of the design system and thus less spatial needs and provide continuous assistance and context-aware advice to the workforce. An execution of this technology looks like a suitable future for the fashion and automation industry, and potential applications are fascinating, such as visualizing the technical information of the job site, visualizing the spatial model layout and advertising. The customers can experience augmented reality to analyze the different factors such as fabric, color, prints and style via AR images.

REFERENCES

[1] Interrante, V., Hollerer, T., & Lecuyer, A. (2018). Virtual and augmented reality. IEEE Computer Graphics and Applications, vol. 38, no. 2, pp. 28–30.

[2] Rosenblum, L. (2000). Virtual and augmented reality 2020. IEEE Computer Graphics and Applications, vol. 20, no. 1, pp. 38–39.

[3] Poupyrev, I., Tan, D. S., Billinghurst, M., Kato, H., Regenbrecht, H., & Tetsutani, N. (2002). Developing a generic augmented-reality interface. Computer, vol. 35, no. 3, pp. 44–50.

[4] Yeh, S.-C., Li, Y.-Y., Zhou, C., Chiu, P.- H., & Chen, J.-W. (2018). Effects of virtual reality and augmented reality on induced anxiety. IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol. 26, no. 7, pp. 1345–1352.

[5] T. Rajendran, M. Baskar, T. Gnanasekaran, N. Mohamed Imtiaz, (2019) "Class Based Semantic Feature Similarity for Efficient Image Mining Using BC Patterns", International Journal of Innovative Technology and Exploring Engineering, vol. 8, no. 6, pp. 355-358.

[6] Cipresso, P., Giglioli, I. . C., Raya, M. A., & Riva, G. (2018). The Past, Present, and Future of Virtual and Augmented Reality Research: A Network and Cluster Analysis of the Literature. Frontiers in Psychology.

[7] Zaldivar-Colado, U., Garbaya, S., Tamayo-Serrano, P., Zaldivar-Colado, X., & Blazevic, P. (2017). A mixed reality for virtual assembly. In 2017 26th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN).

[8] Dinis, F. M., Guimaraes, A. S., Carvalho, B. R., & Martins, J. P. P. (2017). Virtual and augmented reality game- based applications to civil engineering education. In 2017 IEEE Global Engineering Education Conference (EDUCON).

[9] Kim, S. J. J. (2012). A user study trends in augmented reality and virtual reality research: A qualitative study with the past three years of the ISMAR and IEEE VR Conference Papers. In 2012 International Symposium on Ubiquitous Virtual Reality.

[10] Qiao, X., Ren, P., Dustdar, S., Liu, L., Ma, H., & Chen, J. (2019). Web AR: A Promising Future for Mobile Augmented Reality—State of the Art, Challenges, and Insights. Proceedings of the IEEE, vol. 107, no. 4, pp. 651–666.

[11] Weiying, L. (2012). The 3D holographic projection technology based on three-dimensional computer graphics. In 2012 International Conference on Audio, Language and Image Processing.

[12] Helin, K., Karjalainen, J., Kuula, T., & Philippon, N. (2016). Virtual/Mixed/Augmented reality laboratory research for the study of augmented human and human-machine systems. In 2016 12th International Conference on Intelligent Environments (IE).

[13] Patil, S., Prabhu, C., Neogi, O., Joshi, A. R., & Katre, N. (2016). E-learning system using augmented reality. In 2016 International Conference on Computing Communication Control and automation (ICCUBEA).

[14] Thalmann, D. (2003). Virtual humans for augmented and virtual reality. IEEE Virtual Reality, Los Angeles.

[15] Lorenzo, D., Elena, M., Gustavo, M., and Sonia Di V. (2018). Exploiting immersive virtual reality for fashion gamification, IEEE 29th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC). Bologna.

[16] Stefan Hauswiesner; Matthias Straka; Gerhard Reitmayr, (2012). Image-based clothes transfer, IEEE International Symposium on Mixed and Augmented Reality, Basel, Switzerland.

[17] De Paolis, L. T., & Mongelli, A. (Eds.). (2015). Augmented and virtual reality. Lecture Notes in Computer Science. Springer international Publishing.

[18] El Sayed, N. A. M., Zayed, H. H., & Sharawy, M. I. (2010). ARSC: Augmented reality student card. In 2010 International Computer Engineering Conference (ICENCO).

[19] Juan, C., Beatrice, F., & Cano, J. (2008). An Augmented reality system for learning the interior of the human body. In Eighth IEEE International Conference on Advanced Learning Technologies.

[20] Hull, J. J., Erol, B., Graham, J., Ke, Q., Kishi, H., Moraleda, J., & Van Olst, D. G. (2007). Paper-Based Augmented Reality. In 17th International Conference on Artificial Reality and Telexistence (ICAT 2007).

[21] Jonna, H., Ashley, C., Paula, R., and Jani, V., (2017), Clothing integrated augmented reality markers, Proceedings of the 16th International Conference on Mobile and Ubiquitous Multimedia, pp. 113-121.

AUTHORS

First Author -
Gunasekaran Muthumanickam
Professor
Department of Computer Science and Engineering
Saveetha School of Engineering
Saveetha Institute of Medical and Technical Sciences
Chennai – 602105, Tamilnadu, India
Email: gunasekaranm.sse@saveetha.com

Second Author -
Prakash V S
Assistant Professor
Department of Computer Science
Kristu Jayanti College
Bengaluru – 560077, Karnataka, India
Email: vsprakash@kristujayanti.com