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Augmented Reality Based 3D Furniture Shopping

Divyashree R[1], Vibha Shreya Raju[2], Roja J[3], Vinutha B [4], Aruna Kumara B[5]

[1,2,3,4,5]REVA University.
Email: 1divyashreer259@gmail.com[1] , prakash.vibha10@gmail.com[2] , roja80802@gmail.com[3] , b.vinutha63@gmail.com[4] , arun.bethur87@gmail.com[5]

**Corresponding author's E-mail: 1divyashreer259@gmail.com*

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Abstract

The main aim of the paper is to present an Augmented Reality application for 3D furniture, with a particular emphasis on the development of an android application that provides a realistic view of an augmented reality 3D furniture target object in the real-world. This app for Android would overlay a virtual environment on top of the user's real world. AR makes real-world data and presents it in an immersive manner, making the virtual section feel like it belongs in the real world. AR is commonly used in online shopping, and the 3D visualization allows any furniture piece to be configured. Results shows that, users can customize and combine their favorite furniture products, enhancing their shopping experience. This elevates the shopping experience to a new level. This application allows users to see and experience the object in their current environment before buying from a shop, and customers can visualize the furniture model in a real-world setting.

Keywords: *Augmented Reality, Autodesk 3Ds Max, Unity 3D, Vuforia, JRE, JDK, Android Studio*

1. Introduction

Augmented Reality (AR) is an advanced technology that overlaps computer generated objects on the real-life, providing composite view. This technology has been from many years, but it has increased a lot of popularity over a last few year. For buying the products for decorating the interior design is an interesting task and it's basically associated with the problem that the product which is purchased may not be be set into the location identifed. Now a days, the customer doesn't require to go to a shopping center to select the size, design and material of a piece of the furniture. With the help of Augmented Reality, we can do this with the android device. Imagining the furniture in the actual view can be made by the use of AR applications. Customer may have the curiosity that how the furniture could view in its fixed place. With the support of 3D furniture models, they can turn online shopping into a better experience level. AR gives users the freedom to shop on their own terms. They can arrange and decorate in real time without any of the heavy lifting. Once they're up, shoppers can use them in a right way and then it's become easy to put the furniture as they like in home, office, school and beyond. Augmented Reality, also thanks to the fortunate customers and it is giving a innovative look to the world of android device: with Augmented Reality apps it gives loyal to furniture, which gather the data and entertainment, the user's shopping involvement is more individually.

Related Work

In [1], authors proposed performance evaluation of 3D modelling furniture application based on AR. This paper develops an android application with AR based scheme "AR 3D Furniture App"; it uses SDK tool to place the content of AR on regular features observed from the environments. Through this, the customer will imagine how the equipment will look in the actual view, representing the furniture in one's realistic world. The primary cause for this growth is the development regards to hand-held devices and mobiles united with leading technologies such as object recognition and computer vision. System applications in AR that assembles these technologies to make customer ambiances cooperating. By this, the furniture sellers can conquest good superiority in the marketplace. The scheme of this application also avoids income throw down the business and inferior brand images.

A furniture system arrangement in augmented reality is beneficial for observing for a specified platform short of purchasing or else shifting the actual furniture. Anyway, such schemes frequently need customers to physically and regularly vary their viewing platform of the actual space, which involves physical use of the platform, and are partial to use 2D tablet. They established a system which impulsively computes the most appropriate lookout to upgrade the room platform and permits the customers to effortlessly changeover to that viewing platform display with minimal interaction to support. They have used an algorithm named View Recommendation to help the determination of the algorithm, they verified diverse views for different samples. This would support to determine an algorithm for mentioning a best viewpoint for regular environments.

2. Materials And Methods

As shown in the figure 1, it defines the planning of the system application that take the input as a real scene with the help of AR camera then processes it with virtual object to get the subsequent output as augmented 3D furniture model display. Certain software's that we have used are unity 3D, Vuforia, android studio and Autodesk 3Ds Max. The application essentially uses mobile phone in-built camera which helps the AR to gather a view as the actual scene to detected by user eye and displayed the AR based 3D furniture replicas on the screen.

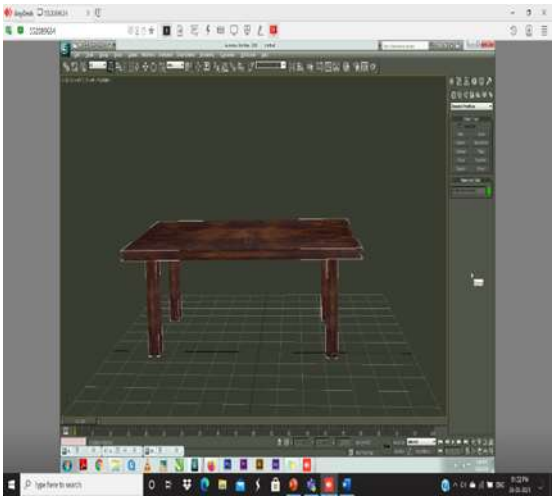

Fig 1: Developing an app in Autodesk 3Ds Max

Initially, we need to arrange the platform in Unity 3D for User Interface of system application like tool buttons, text areas, background image and virtual object collection and then we construct 3D furniture models by Autodesk 3Ds Max and we bring the models into Unity 3D. Through recognizing and scanning the target image, the AR camera obtains indicators and creates projection models, finally we imported 3D virtual model in the Real-world view.

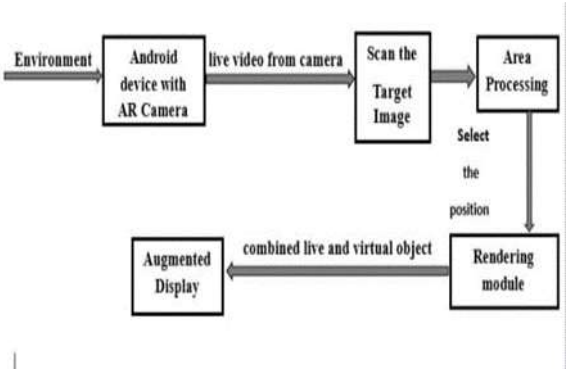

Fig 2: System Architecture

Development of 3D furniture Models

Autodesk 3Ds Max is a professional computer graphics software used to create 3D models, games, animations, and pictures as shown in Fig 1. Autodesk Media and Entertainment created and made it. It must be used on the Microsoft Windows platform and has modelling capabilities as well as a modular plugin architecture. Mainly, first we have to create AR objects and create virtual models which supports the Autodesk 3Ds Max software to establish 3D furniture models and these models can customize shapes and polygon modelling methods. Later we export the model data which stores the information that needs to be displayed it in the scene through Unity 3D platform. With the help of AR

camera, we can import the models in Unity 3D and alter the set of packages that will helps us to scan the target image where we essentially want to place the virtual object in the real world. As soon as the modification is done, the customer can scan the target image then the 3D model of the furniture will be rendered. When the rendered is done the customer can validate the furniture model which outfits to their own requirements. Autodesk 3ds Max proposes a rich and flexible toolset to create finest designs with full artistic control.

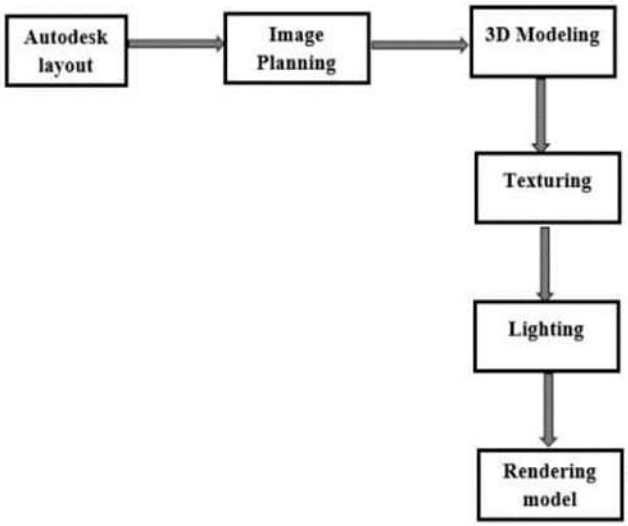

Fig 3: Working of Autodesk 3Ds Max

3. Results and Discussion

Throughout our project, we have gained some better knowledge about Augmented Reality by using Unity 3D, Autodesk 3Ds Max by modeling some 3D furniture models and we came to know that how this application works. In addition, the modified AR 3D model permits the users to understand the theme of this project and therefore we allow them to attain the user's necessities and well design affection. The core benefit of the AR 3D furniture can be reducing the price and provide the multi-media extension of high-level intense recreations for customer in real time. The inclusive outcome is optimistic and display our system which is usable, well-organized, helpful, effective and efficient for home furnishing and furniture buying and it allows the customer to look furniture models in real time view. By this application a user can visualize and sense the furniture in the present environment before purchasing.

Fig4: pop-up images

4. Conclusion

Augmented reality knowledge that allows the users to determine and interact the furniture with the reality, it offers a new variety of furniture for online shopping. It supports the user to see the view and recognize the furniture for customer needs. As a result of this user will get to know that how their interior home structure would look after buying and placing the furniture model with different-color choice. This supports the purchaser in defining how to arrange the furniture in their interior home

structure. The human effort of physically visiting a furniture store, which is a time-consuming task, would be eliminated by this device implementation.

In this paper, an AR app for 3D Furniture is developed that supports user to imagine 3D furniture layout in a virtual place before purchasing the furniture. However, there are several ways to extend this work: i) In future, assume the furniture company will create 3-Dimensional object of the product available for download from their website. ii) The tools may assist as a portion of the application which automatically advises the appropriate furniture and extract the result in combination with the actual-world scene [11-16].

References:

[1] Tahir Ahmed T, Vijaya Shetty S, R.Smairasimha, Sushmitha Bedere J, "Performance Evaluation of Augmented Reality based 3D Modelling Furniture Application", IEEE, 2019.

[2] Jeft KT Tang, Wan-Man Lau and Kwun-Kit Chan, "AR Interior Designer:Automatic Furniture Arrangement using Spatial and Functional Relationships", IEEE, pp.345-352, 2018.

[3] Mami Mori, Jason Orlosky, Kiyokawa and Haruo Takemura, "A Transitional AR Furniture Arrangement System with Automatic View Recommendation", Osaka University, IEEE, 2016.

[4] Jiang Hui, "Approach to The Interior Design using Augmented Reality Technology", Nanjing Forestry University, IEEE, 2015.

[5] Peeranut Reuksupasompon, Maytichai Aruncharathorn, Sirion Vittayakorn," AR Development For Room Design", Faculty of Information Technology, IEEE , 2018.

[6] Dameng Dai, "Stylized Rendering for Virtual Furniture Layout", College of Physics & Electronic Information Engineering, Wenzhou University, IEEE, 2011.

[7] Rohan Moares, Vaishnavi Jadhav, "Inter AR: Interior Décor App Using Augmented Reality Technology" , Department of Computer Engineering, IEEE , 2019.

[8] De Jesús Osuna-Coutiño, J. A., et al. "Dominant plane recognition in interior scenes from a single image." Pattern Recognition (ICPR), 2016 23rd International Conference on. IEEE, 2016.

[9] Marjury, Díaz H., et al. "Offline mobile application for places identification with augmented reality." eDemocracy &eGovernment (ICEDEG), 2017 Fourth International Conferenceon. IEEE, 2017.

[10] S. Bonardi, J. Blatter, J. Fink, R. Moeckel, P. Jermann, P. Dillenbourg, and A. Ijspeert, "Design and evaluation of a graphical iPad application for arranging adaptive furniture," in RO-MAN, 2012 IEEE, Sept 2012, pp. 290–297.

[11] Sudhan Murugan Bhagavathi, Anitha Thavasimuthu, Aruna Murugesan, Charlyn Pushpa Latha George Rajendran, A Vijay, Raja Laxmi, Rajendran Thavasimuthu, Weather forecasting and prediction using hybrid C5.0 machine learning algorithm International Journal of Communication Systems, Vol. 34, Issue. 10, Pp. e4805, 2021.

[12] PM Surendra, S Manimurugan, A New Modified Recurrent Extreme Learning with PSO Machine Based on Feature Fusion with CNN Deep Features for Breast Cancer Detection, Journal of Computational Science and Intelligent Technologies, Vol. 1, Issue. 3, Pp. 15-21, 2020.

[13] PK Sadineni, Comparative Study on Query Processing and Indexing Techniques in Big Data, 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS), pp. 933-939, 2020.

[14] AH Omar Baabood, Prajoona Valsalan, Tariq Ahmed Barham Baomar, IoT Based Health Monitoring System, Journal of Critical Reviews , Vol. 7, Issue. 4, pp. 739-743, 2020.

[15] Sajay KR, Suvanam Sasidhar Babu, Vijayalakshmi Yellepeddi, Enhancing The Security Of Cloud Data Using Hybrid Encryption Algorithm, Journal of Ambient Intelligence and Humanized Computing, 2019. https://doi.org/10.1007/s12652-019-01403-1

[16] Bindhia K Francis, Suvanam Sasidhar Babu, Predicting academic performance of students using a hybrid data mining approach, Journal of Medical Systems, 43:162, 2019. https://doi.org/10.1007/s10916-019-1295-4