



International Journal of Engineering, Business and Enterprise Applications (IJEBA)

www.iasir.net

Augmented Reality: A Study

Aditya Jain¹, Yash Kaushik², Janakkumar B.Patel³, Manjeet Kaur⁴

¹B.Tech, Electronics and Communication Engg. (ECE), Amity University Gurgaon, Haryana, India

²B.Tech, Computer Science Engg. (CSE), Amity University Gurgaon, Haryana, India

³Prof. Electronics and Communication Engg. (ECE), Amity University Gurgaon, Haryana, India

⁴Asst. Prof. Electronics and Communication Engg. (ECE), Amity University Gurgaon, Haryana, India

Abstract: This paper aims at extending an eminent feature of Augmented Reality (AR) which is an emerging technology in which one's perception of the real-time environment is enhanced by superimposing computer-generated information such as graphical, textual, or audio content, as well as objects onto a display screen. The idea is to allow the user to view the virtual object in the real world using a marker based AR system. The user could provide images of the object which would be the front, back, top, bottom, left and right side pictures of the object. They will be placed onto a 3D cube which will make up the complete virtual object. Thus an extended environment will be created through the amalgamation of real world and generated object and it will appear as though the real-world object and virtual object coexist within the environment. The advantages of this application as compared to the already existing 2D application are that it would display object in 3D and enable the user to rotate it virtually. It is inexpensive as the user need not actually purchase the object to see how it fits in the environment, instead he can try before the purchase itself.

Keywords Used: Augmented Reality,

I. INTRODUCTION

Augmented Reality (AR) is the method of mixing virtual and real objects into one spatially coherent read. In most cases, this entails capturing a sequence of images and deciding a camera's spatial cause (position and orientation) at every frame. The camera's position and orientation, along with its internal parameters, provide the essential info required to produce increased realities. Augmented reality (AR) refers to pc displays that add virtual info to a user's sensory perceptions. It is a technique for visual improvement or enrichment of the encircling environment by overlaying spatially aligned computer-generated info onto a human's view(eyes). Augmented Reality (AR) was introduced as the opposite of virtual reality: rather than immersing the user into a synthesized, purely informational atmosphere, the goal of AR is to augment the important world with information handling capabilities. AR research focuses on cobwebby devices, usually worn on the head that overlay graphics and text on the user's read of his or her surroundings. In general, it superimposes graphics over a real world environment in real time. An AR system adds virtual pc generated objects, audio and other sense enhancements to a real-world atmosphere in period of time. These enhancements are supplemental in a method that the viewer cannot tell the distinction between the important and increased world.

II. PROPERTIES OF AUGMENTED REALITY

Augmented reality system to have the following properties:

- a) Combines real and virtual objects in a real environment;
- b) Runs interactively, and in real time; and
- c) Registers (aligns) real and virtual objects with each other

Definition of AR to particular display technologies, such as a head mounted display (HMD) nor do we limit it to our sense of sight. AR can potentially apply to all senses, including hearing, touch, and smell.

A. Displaying Augmented Reality

Virtual reality has set out in a very way more restricted approach than many folks supposed. One reason for this is often the problem of "immersing" folks in a very computer-generated world: ideally, you wish to wear a complicated telephone receiver that fully blocks out the real world and replaces it with a computer-drawn equivalent. With increased reality, the matter is completely different, what we'd like may be an approach of overlaying computer-generated info on what we will see already. once folks 1st started talking concerning increased reality, there was a sense we'd all find yourself walking around in wide-awake displays, like fighter pilots. currently Net-connected cellphones with cameras AR commonplace, they've become the main focus for AR—although which will modification in future. Already, researchers AR engaged on model contact lenses with inbuilt laptop displays, which might lay over things like web content onto our field of vision. Another risk

is sporting eyeglasses with miniature, forward-facing cameras engineered into the frames and clear screens additional to the lenses.

B. Existing AR Applications

There's many on-line info and no shortage of reality the trick is transferral the 2 things along. Some exciting strides area unit already being created during this space by cellular telephone applications like Layar and Wikitude. With Layar, you just inspect your cellular telephone camera at the planet ahead of you and see layers of additional info, like clear webpages, additional on high. Wikitude offers associate application known as World Browser, that overlays helpful info regarding landmarks and different points of interest seen through a camera phone.

C. Vuforia

Vuforia is an increased Reality framework that is developing by Qualcomm company. This platform uses superior, stable, and technically economical laptop vision-based image recognition and offers the widest set of options and capabilities, giving developers the liberty to increase their visions while not technical limitations. With support for iOS, Android, and Unity 3D, the Vuforia platform permits you to put in writing one native app which will reach the foremost users across the widest vary of smartphones and tablets.

D. Unity

Unity3D could be a powerful cross-platform 3D engine and a user friendly development atmosphere. The Unity application could be a complete 3D atmosphere, appropriate for egg laying out levels, making menus, doing animation, writing scripts, and organizing comes. The computer program is well organized and therefore the panels will be spoke by dragging and dropping. Multiple scripts will be connected to one object in Unity, letting straightforward code utilise. Unity supports 3 totally different programming languages; UnityScript, C#, and Boo. UnityScript is analogous to JavaScript and ActionScript, C# is analogous to Java, and Boo is analogous to Python. Unity is ready to publish to Windows, OS X, and therefore the internet via the Unity Internet Player. the online Player could be a browser plugin that works all told major browsers and offers identical performance accessible on the desktop.

III. Augmented Reality Interaction style

Unity 3D and augmented Reality SDK are used to develop the appliance. The tool aims to construct 3D models for interior style of building. we tend to style some marker to be recognized. With Image recognition AR, user holds camera over marker, and event happens in very virtual surroundings.

The following are the transient development steps:

- i. Launch the Unity and import augmented Reality SDK.
- ii. Use package dragged into the Unity project library.
- iii. Establishing tag loading Unity.
- iv. Combine the association perform in Unity.
- v. Builds a correct alignment of 3D object with corresponding marker and at last create android app.

The final read of augmented reality applications consisting of marker generated from target manager at the side of screen, a specialist medical imaging software and the dimension of images was taken 256×256. This will run on Unity Editor, iOS device or Android device

Step 1: Sign-up to Vuforia

This first step is fairly simple, head to the Vuforia Registration page and sign up.

Now head to the license manager page.

Step 2: Grab a license!

Hit the “Add License Key” button to create a license. This will prompt for an Application Name, Device and License Key type.

For now, let's name application anything. Set the device to Mobile and keep the License key type set to Starter. Hit the “Next” button. Accept the Terms and Conditions and hit the “Confirm” button.

Step 3: Download the SDK

Now download the SDK for Unity. Simply head to their Downloads Page and select the Unity SDK. Again, agree to their Terms and Conditions and download will begin.

Step 4: Import the package into Unity

If haven't done so already, create a new Unity Project and load up the editor.

Now double click the package downloaded, Unity will prompt to import everything into the editor.

Simply press the “Import” button and everything will be added to Unity project.

Step 5: Adding the AR camera to the scene

Create a new Scene (Control + N) and drag the ARCamera prefab from the folder Vuforia > Prefabs.

Step 6: Copy license key

Head back to the Vuforia License Manager page and select new license created earlier. Now copy the license key the site presents with.

Step 7: Paste it into Unity

Select the ARCamera object in scene, and paste license key into the “App License Key” section of the Vuforia Behaviour Script.

Step 8: Add in markers

Now for the fun part, creating markers! They can be any image one can think of, generally images with more distinctive points (less repeating patterns) are scored higher.

Step 9: Upload to Vuforia

Head to the Vuforia Target Manager page now and press the “Add Database” button, Set the name to anything and set the type to “Device”.

Select newly created database from the list and now an “Add Target” button would be presented.

Select the Single Image type, set the file to the image downloaded earlier, the width to 1 and the name to anything.

Finally, press the “Add” button.

Head back to the database listing page, and it will show marker as processing. Give it a few minutes and then refresh the page. Now press the “Download Dataset (All)” button and select “Unity Editor” then Download.

Step 10: Import the database into Unity

Double click newly downloaded Unity Package and import it into Unity as before.

Select the ARCamera object in hierarchy, under the Database Load Behaviour and select Load Data Set “Database Name”, then tick the Activate button under it.

Now, select an ImageTarget prefab from the Vuforia > Prefabs folder and drag it into scene.

Click the dropdown bar on Data Set and set it to the name of the database created earlier. The image target will automatically change to the marker that was just created.

For the ease of presentation, set the width and height to 10.

Step 11: Adding objects to your markers

Create a cube object (GameObject -> 3D Object -> Cube) and set it to be the child of your ImageTarget. Do that by dragging the cube object in the hierarchy on top of the ImageTarget object. Now set the cubes position. Settings should be reflected in the scene.

Step 12: Augmented reality with marker is created.

IV. CONCLUSION

This paper proposes a marker based augmented reality application using Android operating system which will help to combine virtual objects with the real environment facilitating various applications as mentioned in this project. The main advantage is use of low cost devices as compared to the costly head mounted display devices. Secondly with the help of this paper it is not needed to buy the product and then see how it will suit the environment. In future images of objects from various views can be fetched directly from vendor’s websites; same could be modelled into a 3D objects and augmented. Also multiple objects will be augmented which is currently a major challenge.

References

- [1]. Rencheng Sun, YiSui, RanLi, Fengjing Shao, The Design of a New Marker in Augmented Reality, 2011 International Conference on Economics and Finance Research, IPEDR vol.4 (2011) © (2011) IACSIT Press, Singapore
- [2]. Aliaga, Daniel G. Virtual and Real Object Collisions in a Merged Environment. Proceedings of VRST '94 (Singapore, 23-26 August 1994), 287-298.
- [3]. Azuma, Ronald, and Gary Bishop. Improving Static and Dynamic Registration in a See-Through HMD. Proceedings of SIGGRAPH '94 (Orlando, FL, 24-29 July 1994). In Computer Graphics, Annual Conference Series, 1994, 197-204
- [4]. Caudell, Thomas P. Introduction to Augmented Reality. SPIE Proceedings volume 2351: Telemanipulator and Telepresence Technologies (Boston, MA, 31 October - 4 November 1994), 272281.
- [5]. Madritsch, F. and M. Gervautz. CCD-Camera Based Optical Beacon Tracking for Virtual and Augmented Reality. Proceedings of Eurographics '96 (Futuroscope - Poitiers, France, 26-30 August 1996).
- [6]. Wloka, Matthias M. and Brian G. Anderson. Resolving Occlusion in Augmented Reality. Proceedings of 1995 Symposium on Interactive 3D Graphics (Monterey, CA, 9-12 April 1995), 5-12.
- [7]. Milgram, Paul, David Drascic, Julius J. Grodski, Anu Restogi, Shumin Zhai, and Chin Zhou. Merging Real and Virtual Worlds.
- [8]. Neumann, Ulrich and Youngkwan Cho. A Self-Tracking Augmented Reality System. Proceedings of VRST '96 (Hong Kong, 1-4 July 1996), 109-115.
- [9]. McMillan, Leonard and Gary Bishop. Plenoptic Modeling. Proceedings of SIGGRAPH '95 (Los Angeles, CA, 6-11 August 1995). In Computer Graphics, Annual Conference Series, 1995, 39-46.
- [10]. Deering, Michael. High Resolution Virtual Reality. Proceedings of SIGGRAPH '92 (Chicago, IL, 26-31 July 1992). In Computer Graphics 26, 2 (July 1992), 195-202.