AR-CART

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Abstract- *Nowadays, there are lots of changes in mobile application development. Especially the new technology called augmented reality makes many differences in application development. It combines virtual reality with actual reality.it is a way of transforming information from the virtual world to the real world. There are lots of problems while buying the items online. Customer is confused when buying the big items like housing, furniture, dining table, sofa, etc. Using the today's new technology called AR (Augmented Reality) we can create a virtual view of any online item so user can see the item via his phone camera before buying it and place that item anywhere to test it. Users can also scan any real-world object to see its 3D view. We can see the augmented 3D view of any items. This paper represents the example of an Augmented Reality application called AR-Cart.*

Keywords- Augmented Reality, AR-Core, AR-Kit, Android, Unity, Marker Detection, Rendering, Image Processing, Vuforia, Animation, 3D.

I. INTRODUCTION

Augmented reality technology in smartphones or tablets is creating a lot of attention nowadays. By using specialized software like unity, XCode, amazon Sumerian, android, etc. users can turn their iPhone, Android, windows or other smartphones into a virtual heads up display.

It gathers a wide variety of user experiences. We are going to develop a system with augmented reality technology in which users can try any online big items like house-holds, furniture, dining table, sofa, etc. at any ware by one click. The user only has to select an item they like and their smart phone's camera automatically opens to give them a 3D preview of the selected item. It will not be necessary to go to the retail-shop and long searching for the larger user needs or use a measuring tape to find out whether or not the item would fit in the customer's room or not.

II. OBJECTIVE

The main purpose of this project is to develop an application for various items in online stores to see their virtual view without using the actual one and that one is incredibly exhaustive and time-consuming activity. By using this application, it will be a more convenient way for the user to do online shopping for such big items like furniture stuff.

This will additionally help the user to try out the such big items in their room and they will be able to see how it will look after placing them in it. Users can select and place multiple objects virtually without physically moving the items in the living room. Our main motivation here is to increase the time efficiency and additionally improve the accessibility of this type of big items online to try on by making this layout in augmented reality.

II. LITERATURE REVIEW

A. Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to mediated reality, in which a view of reality is modified by a computer. As a result, the technology functions by enhancing one’s current perception of reality.

B. Unity is the ultimate game development platform. You can use Unity to build high-quality 3D and 2D games, deploy them across mobile, desktop, VR/AR, console. It is a cross-platform game engine. which is primarily used to develop video games and simulations for computers, consoles, and mobile devices

C. Vuforia is an augmented reality software development kit for creating Augmented Reality apps. Developers can easily add advanced computer vision functionality to any application. It uses computer vision technology to recognize and track planar images and 3D objects in real-time.

D. ARCore is Google's platform for building augmented reality experiences. Using different APIs, ARCore enables your phone to sense its environment, understand the world and interact with information. Some of the APIs are available across Android and iOS to enable shared AR experiences.

E. Apple ARKit is Apple's augmented reality (AR) development platform for iOS mobile devices. ARKit allows developers to build high-detail AR experiences for iPad and iPhone. Environments captured through the device can have animated 3D virtual text, objects and characters added to them.

We are using unity 3D engine for developing a AR-CART App with Vuforia's database and ARCore plugins to run in android device. We also use android studio for creating an apk file run it in any android phone which support google ARCore service.

III. STUDY FINDINGS

A. AR-Cart is able to detect Ground plane surface either vertically or horizontally by using Vuforia's plane finder and ground plane detection or we can use ARCore's AR session and AR Origin.
B. For effective UI we can use Canvas and add buttons, Scrollbars, Raw Image etc. to build more interventive user interface to enhance user experience or we can use Android's scene forms to create better UI.
C. In this App user is able to rotate and scale the virtual 3d object to do that we can use lean script asset from the asset store of unity and apply it to all 3d objects.
D. For motion tracking and light estimation, we use ARCore plugins and for track the device's position and orientation in physical space we use AR Foundation plugins.
E. To store our data in cloud we use Vuforia's cloud service which is free for developers to test the augmented reality applications. We can also download database image from Vuforia and locally store them in to user's mobile.Vuforia Web Services are useful to manage these large image databases in the cloud
F. We can use the object scanner feature of Vuforia engine to scan our real-world object and we can generate its virtual view and place it into real world. User is able to put multiple object in real world and that is implemented using Vuforia's Multi target Feature.
G. The minimum hardware requirement to develop such a system is Memory of 8 GB RAM or more, Monitor resolution of 1920*1080 or highest access, Intel i5 6th gen or AMD Ryzen 5 (or faster), 128 GB SSD (or more).

V. FUTURE ENHANCEMENT

The proposed system is based on user experience. But for future scope in enlarging the system we can use latest ARCore Depth API for more realistic experience which will improve ground detection and place the virtual objects behind real world objects.

VI. CONCLUSION

This system will help the customer to view the online products virtually in a real environment before buying the item. Due to these systems, customers will come to know-how their home structure would look after purchasing and placing online products. this system will also allow the user to put multiple virtual objects in their living room or real world

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REFERENCES

[1] Augmented reality crash course: https://www.udemy.com/course/develop-augmented-reality-book-ar-business-card-with-unity/
[2] Learn Vuforia &Create Database with Vuforia : https://library.vuforia.com/content/vuforia-library/en/getting-started/overview.html
[3] For ARCore Learning: https://developers.google.com/ar/develop/unity
[4] For C# Scripting: https://docs.unity3d.com/ScriptReference/
[5] Virtual Reality and Augmented Reality: Myths and Realities by Bruno Arnaldi published on 2018