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PROJECT REPORT
ON

“MOBILE AUGMENTED REALITY: FURNITURELAND”

Abstract:

By selecting the project theme as Mobile Augmented Reality this project is somewhat the future version of the IKEA website. In IKEA the customers are just able to augment the furniture to the desired place so that they can check for the aesthetics and ambience and then choose whether to buy or not the furniture that is very much appropriate for the house. But this project is an advanced version where when the customer clicks on the screen so that the furniture is augmented on the plane ground surface somewhat like a free fall from the sky onto the ground along with the landing sound in order to gain the customers attention . After some induced delay for few seconds an audio starts playing that gives the detailed description about the furniture like weight, material , texture, width , size, warranty, guaranty, different available colors in the same pattern etc as most of the users don't like to go through the description but would rather have the knowledge about the furniture once it is augmented. For this I have used Unity(2018.4.25/26) with inbuilt Vuforia and used android sdk and jdk . Here I was able to deploy the audio once the camera was rendered but the furniture did not come in place as there was a bug detected in Unity(2018.4) where the Vuforia initialization and target detection has been a problem.

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1. Background:

Mobile video games are really one of the foremost exciting growth spots for area unit applications. Mobile area units leverage the cosmopolitan hardware base, similar to smartphones and tablets. At a really rapid pace, mobile devices which might support area units have become a lot more economical and fewer expensive. increased reality possesses the potential to vary however we have a tendency to look.

Marker-based apps use predefined markers to trigger the show of area unit overlays on high of the image. Location-based apps use GPS, measuring instruments, or compass info to show area unit objects on high of physical ones. It absolutely was proven that once individuals bit or move with a product, they're a lot of possible to shop for thanks to the emotional bond established.

Since I even have chosen marker-based applications there's quite a little description on what marker primarily based applications are.

1.a. Marker-based applications

Marker-based apps are supported image recognition. to visualize the increased element, you have to point the camera on a marker's position anywhere around you. Once the device acknowledges the marker, an app overlays the digital knowledge on this marker and you'll be able to see the increased object. Once you build a marker-based app, you give the pictures or their descriptors beforehand to change the method of looking at them once the camera knowledge is being analyzed.

It's no marvel that the bulk of area unit apps are marker-based.

1.b. ACM Digital Library contents:

There are also an ACM scientific existing literature on

1. **"Mobile consumer shopping journey in Fashion retail: Eye tracking mobile apps and websites"[1],**

2. "Technology meets Fashion"[2] ,

3. "Consumer Fashion Textile researches"[3] ,

4. An Augmented Reality Game using Face Recognition Technology[4],

5. Scalable recognition and tracking for mobile augmented reality[5],

6. A UX Oriented Evaluation approach for Mobile Augmented Reality Applications[6] etc.

Explanation of few:

a. **An Augmented Reality Game using Face Recognition Technology:**

In this paper, we tend to explore the coupling of mobile automatic face recognition technology with the exploitation of non-players as a robust mechanic in participant role increased reality games. An image game is given that asks players to «capture» the likeness of members of the general public. With Homelessmon GO we tend to give a game style that expands upon this and encourages interaction with non-imaginary homeless folks. transfer players and therefore the homeless into shut, direct contact can foster improved relations between the 2 teams, with society as an entire making the most of this union. We tend to conjointly acknowledge that grabbing pictures of homeless folks is already AN existing technological activity in some cities , which Pokémon GO has galvanized use cases in war zones .

b. **Scalable recognition and tracking for mobile augmented reality**

Vision based mostly chase is capable of being actual and strong, however as a mobile increased reality system, the quantity of objects it will augment was so much restricted. During this paper, we have a tendency to propose a brand new framework that overcomes limitations of previous works in 2 points. One, our framework is scalable to the quantity of objects being increased. Two, our framework provides improved realistic augmentation adopting a period of time correct visual chase methodology.

This entire reference paper content offers you and plan concerning however chase is completed within the increased reality in your mobile phones. However scalable it ought to be, what are the visual parts that may attract the users and what syllables and words should be used and the way to use it. I actually have thought of this to implement chase options in my application

c. **A UX Oriented Evaluation approach for Mobile Augmented Reality Applications**

Augmented Reality presents a digitally enhanced 3D the real world, connecting users with meaningful content. AR is developing with the advancement in fields of computer graphics and Human Computer Interaction and can be experienced on handheld devices such as mobile phones, tables etc. However, in order for AR to mature further methods and procedures to conduct User experience evaluations on AR applications are required.

2. Project Concept:

2.a. Detailed Explanation about usage of Application:

I will be explaining in steps how the application should work :

1. Initially the user will download the application from the app Store. The Name of the application is **"FurnitureLand".**

2. Upon opening the application it asks the user to sign in if you are already an account if not create an account by giving details.

3. It prompts you with agreeing terms and condition accept those and give the application permission of using the phone Camera both front and rear.

4. Finally the person opens the app and the Welcome page(main front page) appears with multiple content such as current offers, most recommended options, current trend, highest purchase , high customer review products etc. Also there are options such as custom-settings, customer account details, it has options to choose different categories etc.

5. The user selects the option called custom-setting on the left above corner, which gives a drop down for the customer to choose such as product type, color selection, category selection such as sofa , TV stand, wooden products etc

6. Upon selecting the wooden products option in the custom setting a different page appears with other options that are related to products such as table, cupboard, dressing stand, kitchen racks etc. Let us consider that the user selects the table section in order to buy a teapoy.

7. Once the teapoy option has been selected a new page appears which contains of multiple options of teapoys for the customer to select. She/He can scroll upon which new designs will be loaded else list of pages are given in the end she can click them and jump to any page which contains set to earrings.

8. There again she has options such as filter and sort to reduce the number of designs according to her preferences.

9. The user finds a perfect teapoy as per her requirement and she selects that. Upon selecting there she has again multiple options such as try-me, customer review, product details, delivery time etc.

10. The user selects **TRY-ME** option by which the rear camera of the smart phone is selected and she can see the augmented teapoy on which ever place she is pointing at, she can identify how the table might look in that place when she buys them actually. Thus giving an appropriate exact idea for customers to choose the products that best suits them.

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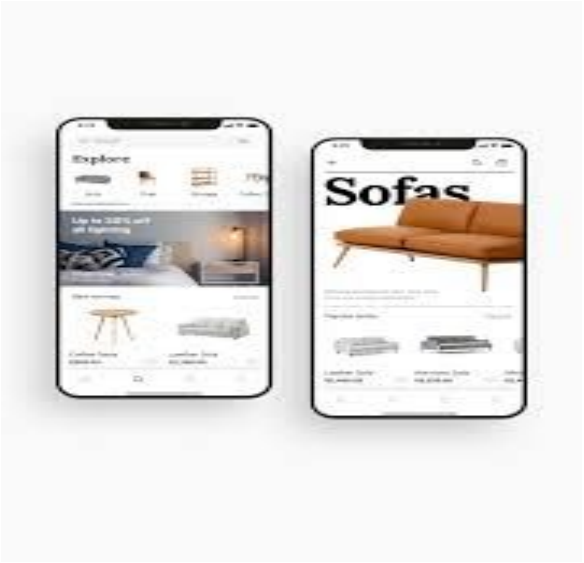

2.b. Storyboard:

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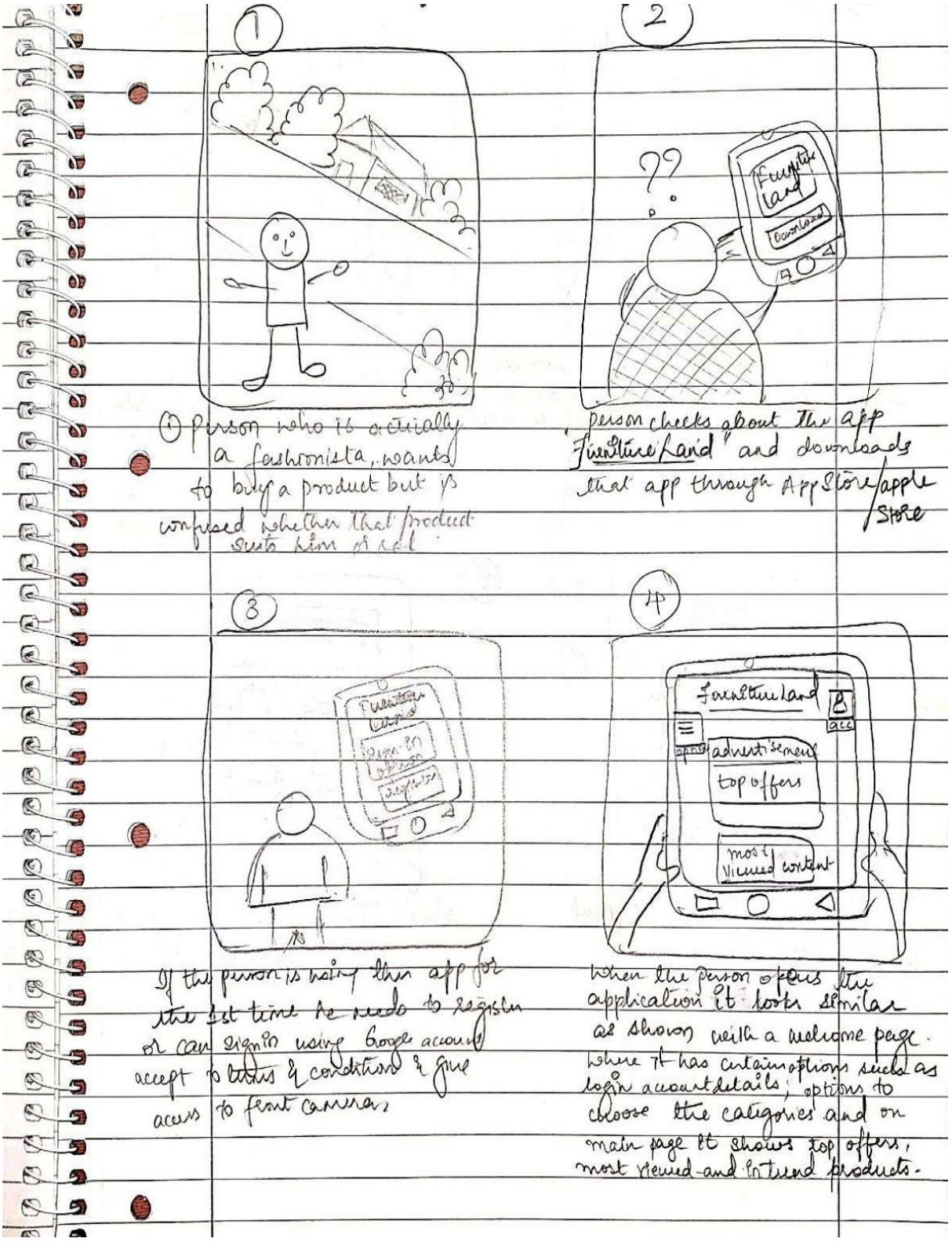

1) person who is actually a fashionista, wants to buy a product but is confused whether that product suits him or not

2) person checks about the app Furniture Land and downloads that app through App Store/apple store

3) If the person is using the app for the 1st time he needs to register or can signin using Google account accept to terms & conditions & give access to front camera.

4) When the person opens the application it looks similar as shown with a welcome page. where it has certain options such as login account details, options to choose the categories and on main page it shows top offers, most viewed and in trend products.

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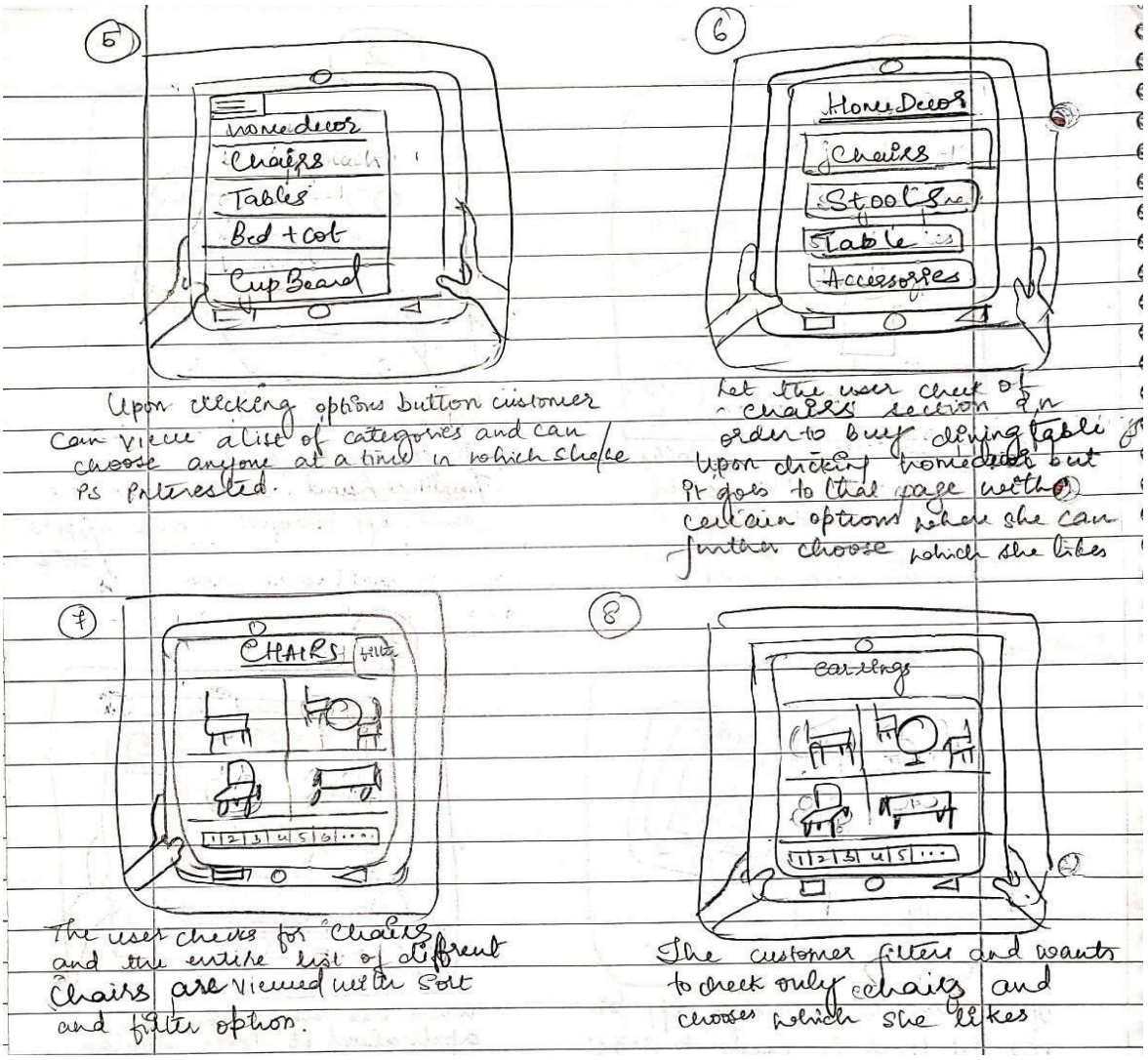

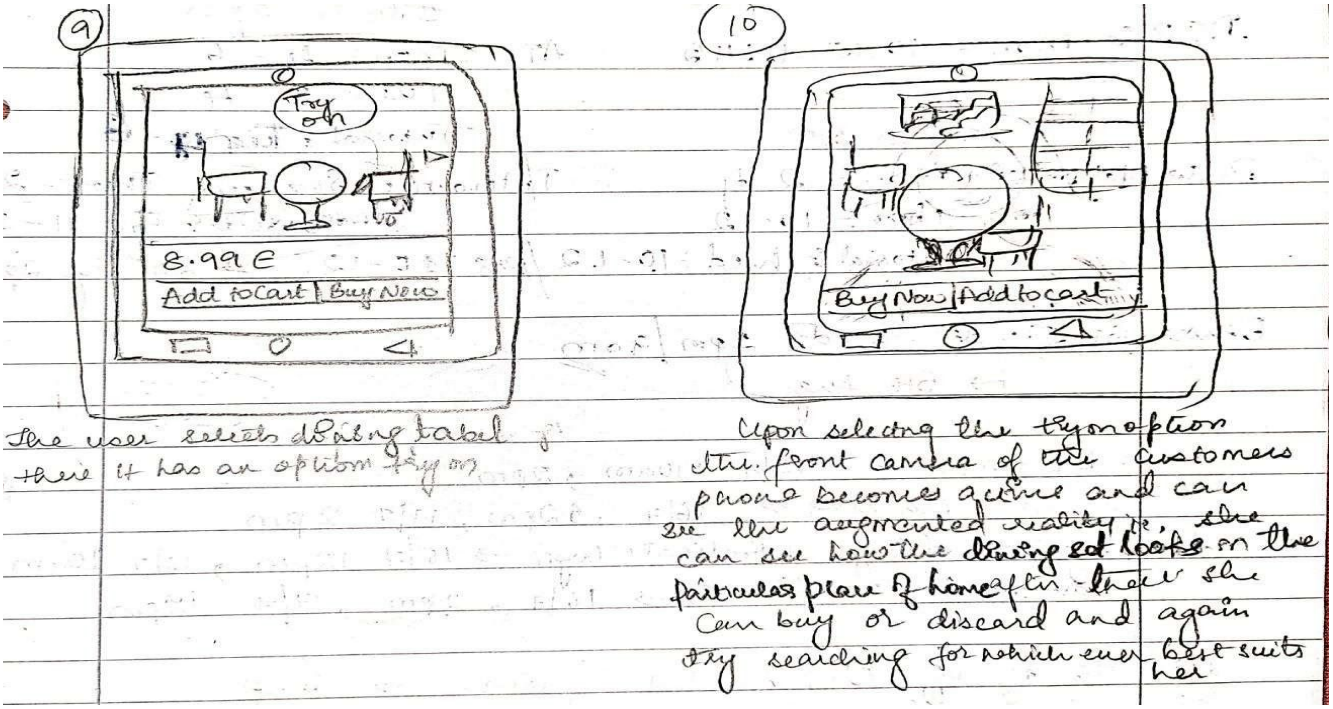

3. Project Implementation:

3.a. Prerequisites and Set-up of Software: [mostly referred Vuforia and Unity website documentation]

1. Install the latest version of Unity, and in the Unity component selection section of the installer, select Vuforia Augmented Reality Support, along with Android Build Support packages.
2. Create a Vuforia developer account from the Vuforia Registration Page . This account gives you access to the tools you need to make AR and MR applications with Vuforia in Unity.
3. If you have not already created a Unity ID, then do so from the Unity Registration Page. You need a Unity ID to download any packages from the Unity Asset Store
4. Open Unity and create a new 3D Project (make sure the 3D option is selected next to the Add Asset Package button). Name your Project, then click the Create project button.
5. To activate Vuforia in your Unity project, access the Player settings from Edit > Project Settings, then select the Player category, and select the tab for the mobile device you are building to. Under the XR Settings panel, enable the Vuforia Augmented Reality Support property.
6. To add an AR Camera to your scene, go to GameObject > Vuforia > AR Camera..
7. Create a new folder in your project. To do this, navigate to the Project window, click the Create button, and select Folder. Name this new folder *Scenes* and save a new Scene inside this folder.
8. Visit the Vuforia Developer Portal and log in (or create a new account). Navigate to the License Manager in the Develop section and click the Get Development Key button to open the Add License Key page.
9. On the Add License Key page, enter a name for your app. Accept the terms and conditions, then click the Confirm button to generate a new license key.
10. Copy the license key to the clipboard and navigate back to your Unity Project.Select the ARCamera GameObject from the Hierarchy window and, in the Inspector window, navigate to the the Vuforia Behaviour(Script) component and click the Open Vuforia configuration button.The Inspector window displays a list of Vuforia Configuration options. Paste your Vuforia Development key into the App License Key text box under the Vuforia section and then click the Add License button.

3.b. Steps to create this application:

1. As mentioned in " Prerequisites and Set-up of software " download and Install Software.
2. Since we tend to don't seem to be making a complete application as however Amazon, Sephora and Nyka works we tend to simply gap the app that has access to each front and rear camera and take a look at to trace the objects and place the increased things.
3. The technology of object tracking permits exploitation of real objects as targets, you would like to give a 3D knowledge of your target. The app ought to be able to scan not simply second pictures however conjointly 3D images too freelance of their size.
4. Here Objects are pre-mapped as targets i,e., Camera capture or Photos. It ought to be able to determine the face of the client and place the accessories consequently
5.

3.c. Overview: Steps

1. Start a new project.

2. Open Build Settings from File> Bild Settings

3. Click Andriod to modify the Platform

4. Open Player Settings and browse to XR settings Tab and choose the Vuforia Augmented Reality

5. Add Vuforia AR camera to scene(by doing this Unity will import packages for Vuforia)

6. Add Database marker created in Vuforia developer portal.

7. Setup Vuforia Configuration.

8. Add License key and check for marker database.

9. Check the application and AR camera.

10 Add an image to hold the marker image and set up image target.

11. Click the scene area and hit "F" key in order to focus the selected the image.

12. Right click on ImageTarget and choose the shape you would want to add, this shape will be added as a child of ImageTarget.

13. you will be able to layout and change the dimension of the augmented object.

14. Testing : Hit play button to start the camera(playmode), when you bring the marker infront of the camera you will the augmented object on that marker.

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Code snippet :

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

public class FLController : MonoBehaviour
{
    private bool soundplayed = false;
    // Start is called before the first frame update

    // Update is called once per frame
    void Update()
    {
        if (!soundplayed && transform.localPosition.y < 0.05)
        {
            soundplayed = true;
            GetComponent<AudioSource>().Play();
        }

    }
    public void Movefurniture()
    {
        transform.localPosition += new Vector3(0, 10, 0);
        soundplayed = false;

    }
}
```

3.d. General:

Image Targets represent pictures that Vuforia Engine will sight and track. The Engine detects and tracks the image by comparison extracted natural options from the camera image against a celebrated target resource information. Once the Image Target is detected, Vuforia Engine can track the image and augment your content seamlessly victimization best in market image chase technology.

Common uses of Image Targets embody recognizing and augmenting written media and merchandise packaging for selling campaigns, gaming, and visualizing product within the atmosphere wherever the merchandise was intended to be used.

3.e. Steps:

1. Start with a Vuforia Enabled project
2. Create a new Vuforia Target Database
3. Create and Upload an Image
4. Import 3D image into the asset folder.
5. Download and Import the Database in Unity
6. Set the AR Camera to use the new database
7. Create a Target Image Asset with the database texture
8. Add more features to the Asset object through the inspector.
9. Add Rigidbody and set the gravity on.
10. Add sound track to the object by selecting add component and search for Audio Source and give this imported file name.
11. Keep saving the scene frequently.
12. Check the game view and orient the object.
13. Upon click of the play button the webcam of the computer should switch on.
14. In the scene window you should be able to see the object.
15. Enable USB debugging mode on your mobile device.
16. Connect your mobile device to the computer using USB cable.
17. Build and run procedure : File > build settings > refresh the run device and connect to your mobile device > click build and run button.
18. Upon clicking the build & run the apk starts transfering to the mobile device , open and check for the application.

3.f. Software needed:

Unity ,Vuforia, Visual Studio

Android studio(android sdk)

JDK

Vuforia Database to store Furniture pictures

3.g. Hardware needed:

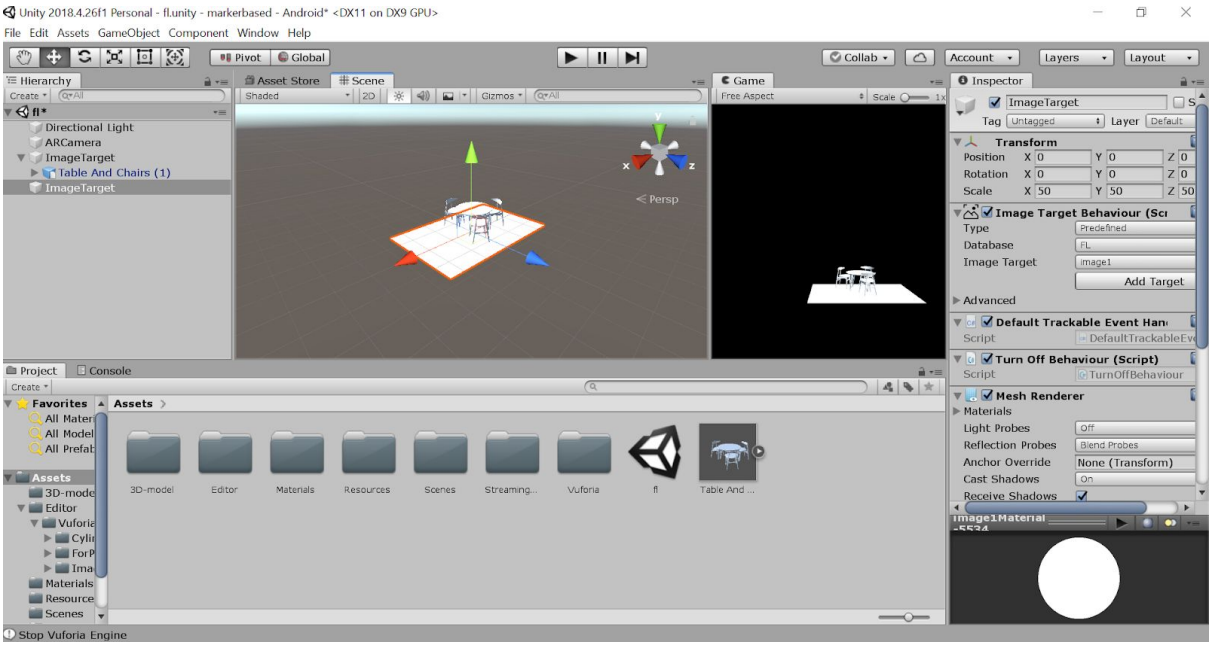
The hardware needed would be a phone, a notebook, pen and paper for more sketches and planning. But also real life products for example make up products for referencing and a smartphone for implementation.

3.h. Vuforia

Vuforia is a leading portal for augmented reality application development that has a broad set of features. Vuforia augmented reality SDK:

- Recognizes multiple objects including boxes, cylinders, and toys as well as images.
- Supports text recognition including about 100,000 words or a custom vocabulary.
- Allows creating customized VuMarks, which look better than a typical QR-code.
- Allows creating a 3D geometric map of any environment using its Smart terrain feature
- Turns static images into full motion video that can be played directly on a target surface.
- Provides a Unity Plugin.
- Supports both Cloud and local storage.

3.i. Implementation Screenshots:



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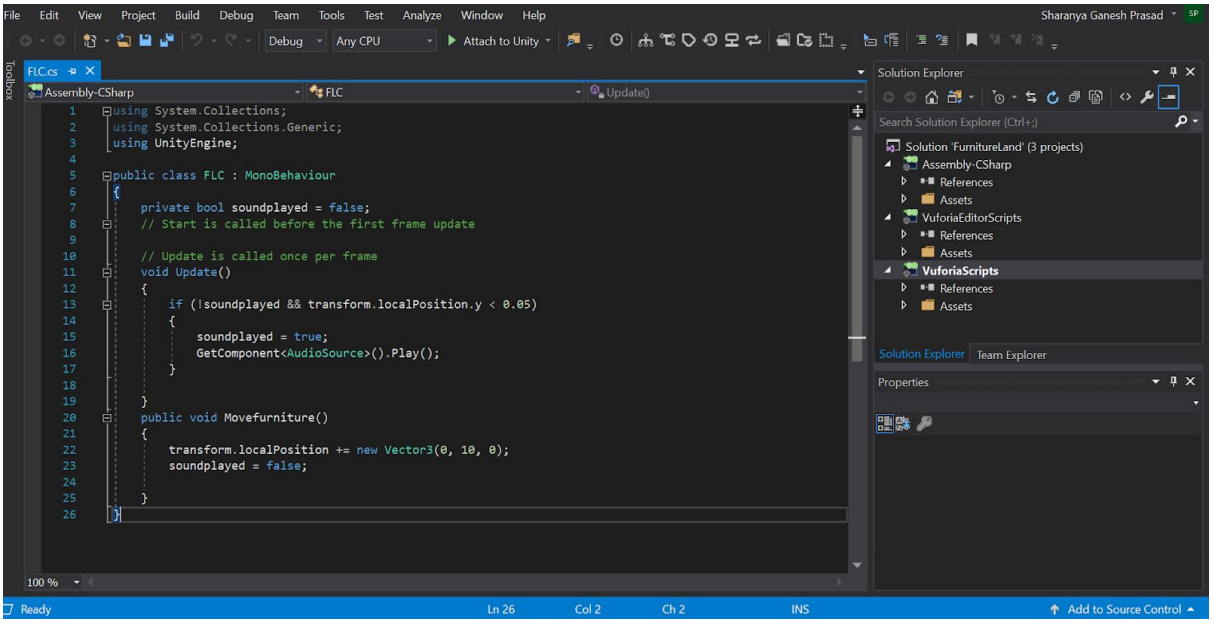

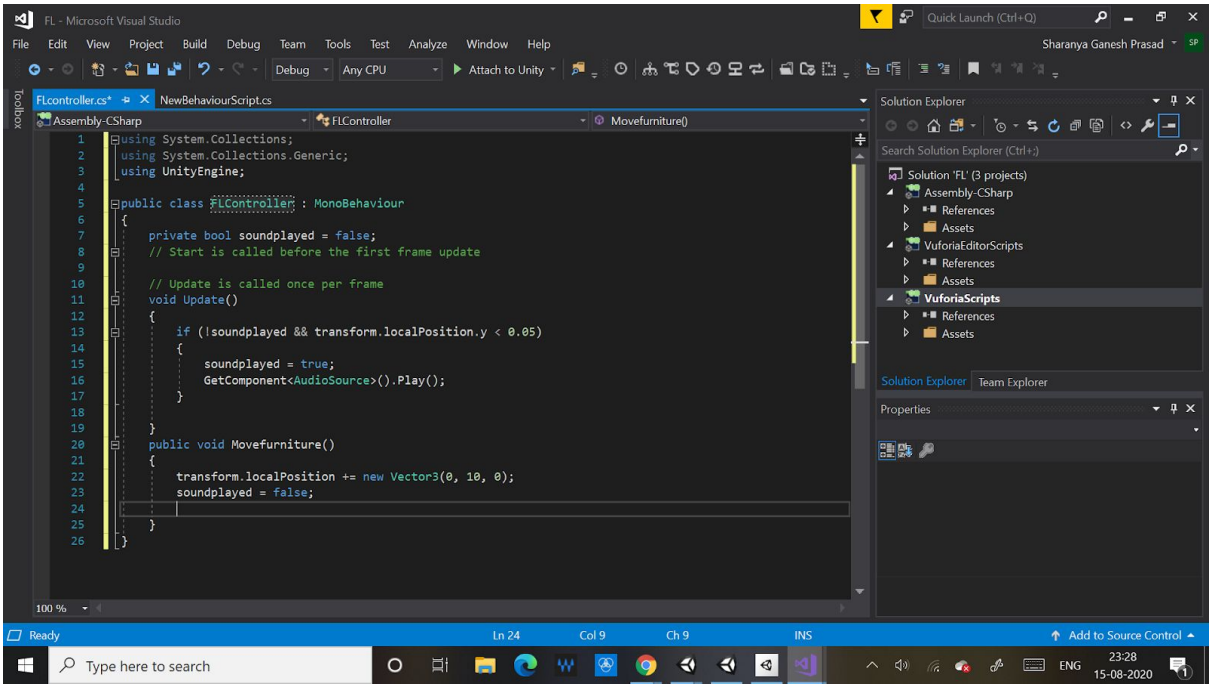

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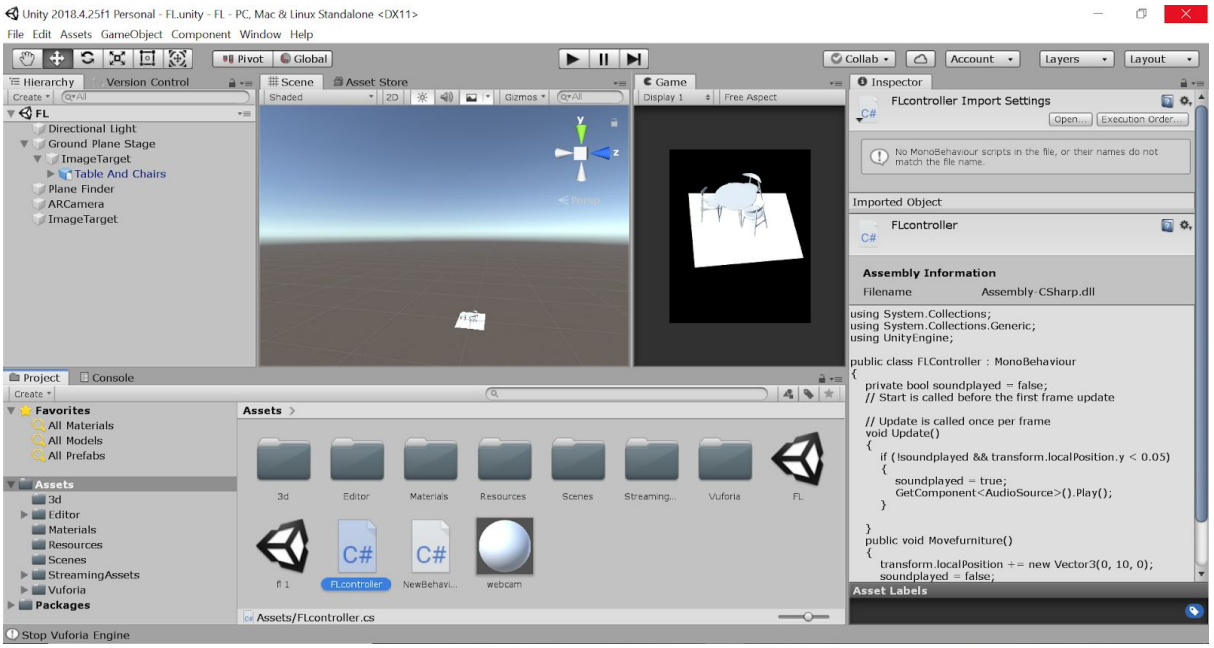
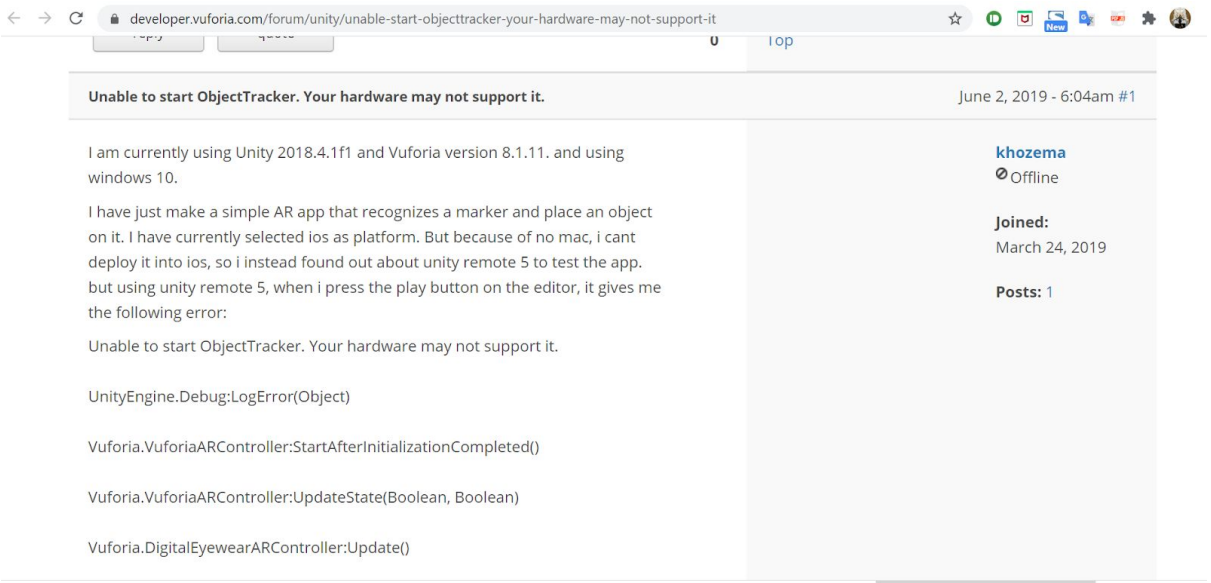


Lessons Learned:

- I tried to install the latest version of **Unity(2020.0a/0b)** in UnityHub that does not have inbuilt Vuforia for which I had to download another package and then place it in the same folder as Unity and then run the project.
- Inspite of every possible try the Vuforia Augmented reality option did not pop up in the XR -setting because of which I again had to download the the old version **Unity2018.4.2** which has inbuilt Vuforia.
- Under the package Manager list of packages are visible out of which I tried to download **AR Core XR plugin** but it was showing error as it did not support my current version of Unity so I had to uninstall that.
- Under the **Player settings** select **OtherSettings** an error popped up saying Vuforia does not support **Android TV Compatibility** option.
- I tried to Build and Run the project it kept on asking for the location of the Android SDK because of which till now I could not run the application.
- How to add a GameObject to the C# script.
- Unity 2018.4.25 /26 has a bug and in this vuforia initialization is highly not possible as the object will be deployed in the scene window but in play mode and also in build the object is not visible at all.



developer.vuforia.com/forum/unity/unable-start-objecttracker-your-hardware-may-not-support-it

0 Top

Unable to start ObjectTracker. Your hardware may not support it. June 2, 2019 - 6:04am #1

I am currently using Unity 2018.4.1f1 and Vuforia version 8.1.11. and using windows 10.

I have just make a simple AR app that recognizes a marker and place an object on it. I have currently selected ios as platform. But because of no mac, i cant deploy it into ios, so i instead found out about unity remote 5 to test the app. but using unity remote 5, when i press the play button on the editor, it gives me the following error:

Unable to start ObjectTracker. Your hardware may not support it.

UnityEngine.Debug:LogError(Object)

Vuforia.VuforiaARController:StartAfterInitializationCompleted()

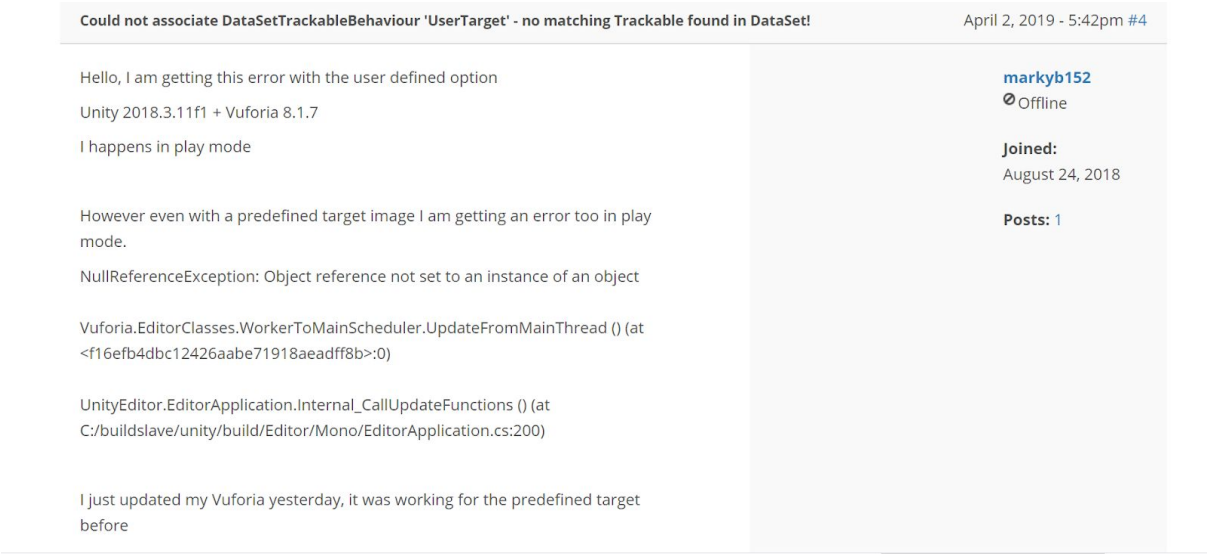
Vuforia.VuforiaARController:UpdateState(Boolean, Boolean)

Vuforia.DigitalEyewearARController:Update()

khozema
Offline

Joined:
March 24, 2019

Posts: 1



Could not associate DataSetTrackableBehaviour 'UserTarget' - no matching Trackable found in DataSet! April 2, 2019 - 5:42pm #4

Hello, I am getting this error with the user defined option

Unity 2018.3.11f1 + Vuforia 8.1.7

I happens in play mode

However even with a predefined target image I am getting an error too in play mode.

NullReferenceException: Object reference not set to an instance of an object

Vuforia.EditorClasses.WorkerToMainScheduler.UpdateFromMainThread () (at <f16efb4dbc12426aabe71918aeadff8b>:0)

UnityEditor.EditorApplication.Internal_CallUpdateFunctions () (at C:/buildslave/unity/build/Editor/Mono/EditorApplication.cs:200)

I just updated my Vuforia yesterday, it was working for the predefined target before

markyb152
Offline

Joined:
August 24, 2018

Posts: 1

Vision and Outlook:

This project is similar to that of IKEA with extra features embedded , such as when ever a customer tries to locate the position and wants to check on the augmented furniture certain effects can be deployed such as Rigibody(free fall of the furniture from the sky on to the ground) Audio Source (a clip can be inserted which gives details about the furniture like the material , texture, size, weight , durability, guarantee or warranty). Thus by applying such features in the application there are high chances to gain costumes appreciation and to attract them because people are attracted to sound and audio than reading the text to gain knowledge and information.

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Resources:

GIT REPOSITORY(HTTP)

Video :

https://drive.google.com/file/d/1vLryPmrb_2FroGyp-hfEXCSQHUBHObyw/view?usp=sharing

References:

[1]. Matthias Baldauf, Peter Frŏhlich, and Siegfried Hutter. 2010. KIBITZER: A wearable system for eye-gaze-based mobile urban exploration. In *Proceedings of the Augmented Human International Conference.* ACM, 1--5.

[2]. Technology Meets Fashion: Exploring Wearables, Fashion Tech and Haute Tech Couture Teddy SeyedUniversity of Calgary2500 University Drive N.W.Calgary, AB T2N 1N4, Canadateddy.seyed@ucalgary.ca

[3]. Jin M. Chae. 2016. The Effect of Mobile Fashion Shopping Characteristics on Consumer's Purchase Intention. *Fashion and Textile Research Journal* 18, 1 (2016), 38--47.

[4]. DIS '17 Companion: Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive Systems June 2017 Pages 44–49 https://doi.org/10.1145/3064857.3079117

[5]. href="https://dl.acm.org/doi/abs/10.1145/1900179.1900213">**Scalable recognition and tracking for mobile augmented reality** by Jaewon Ha, Kyusung Cho, H. S. Yang

VRCAI '10: Proceedings of the 9th ACM SIGGRAPH Conference on Virtual-Reality Continuum and its Applications in Industry December 2010 Pages 155–160 https://doi.org/10.1145/1900179.1900213

[6]. Shafaq Irshad , Dayang Rohaya Bt Awang MoMM2018: Proceedings of the 16th International Conference on Advances in Mobile Computing and Multimedia November 2018 Pages 108–112 https://doi.org/10.1145/3282353.3282357 href="https://doi.org/10.1145/3282353.3282357">

[7] Vuforia developer website documentation :
https://library.vuforia.com/articles/Release_Notes/Vuforia-SDK-Release-Notes

[8] Unity Documentation manual :
https://docs.unity3d.com/2018.4/Documentation/Manual/index.html