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BANGALORE, INDIA

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Augmented Reality Using Mobile Device (Marker Based)

by

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About Augmented Reality

Augmented Reality or AR is a technology that superimposes a computer generated image on a user's view of the real world, thus providing a composite view.

In other words AR can be an application that uses a camera to show a 3D structure when viewed under that particular application.

There are different types of Augmented Reality available, they are as follows:-

- AR using mobile devices
    - Marker based AR
    - Markerless AR
- AR using other devices
    - VR Gears
    - Google Cardboard

Difference between Marker Based and Markerless AR

Markerless is a type of AR where there are no set points, there is only a grid type layout on which we work. It doesn't need any previous knowledge of user's environment to enable a 3D content projection on a stage and hold it on a fixed point in space.

Whereas Marker based is the basic technique of AR where the user is needed to define a tracker. In other words, a marker has a set image on which it can augment.

Setting up a Basic AR-

- **Software Requirements-**
  - Unity 3D(32 or 64 bit based on your system)

  - Vuforia Unity Plugin

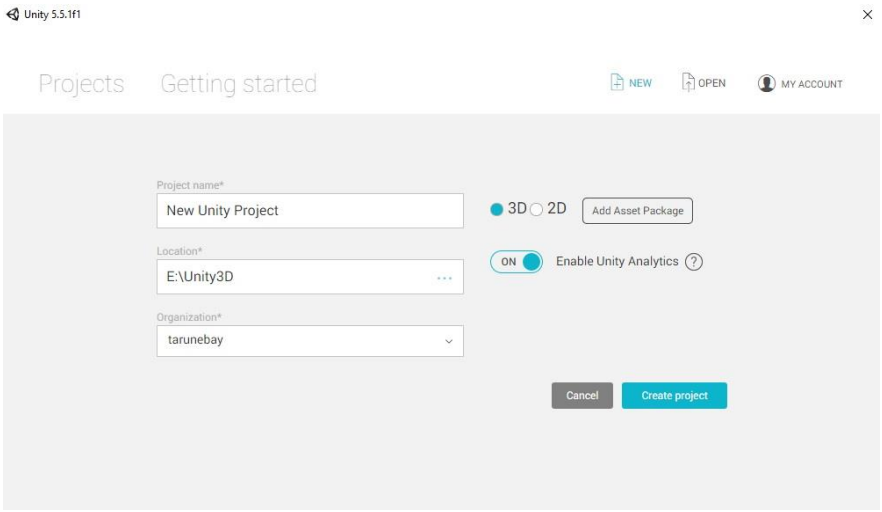
- **Steps:-**

1. Download and setup **Unity 3D**(See **Annexure 1**)

2. Download **Vuforia Plugin**(See **Annexure 2**)

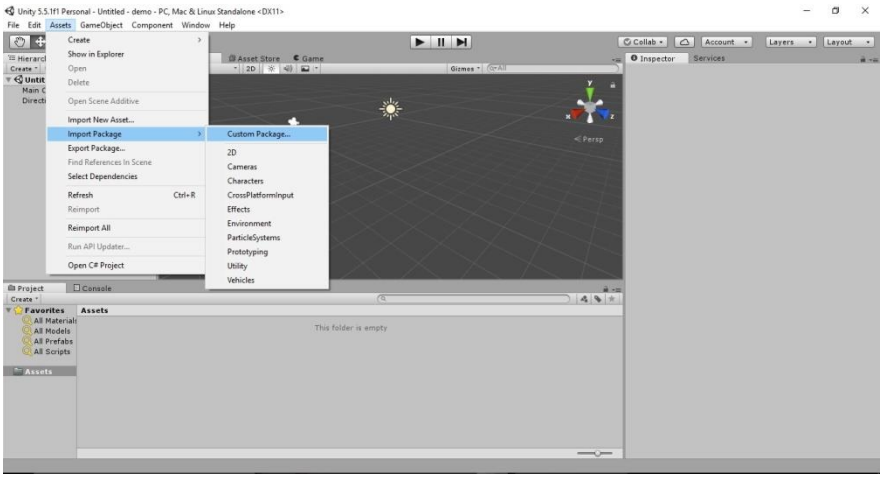
3. Open **Unity 3D** application

4. Click on **New**(make sure it is a 3D Project)



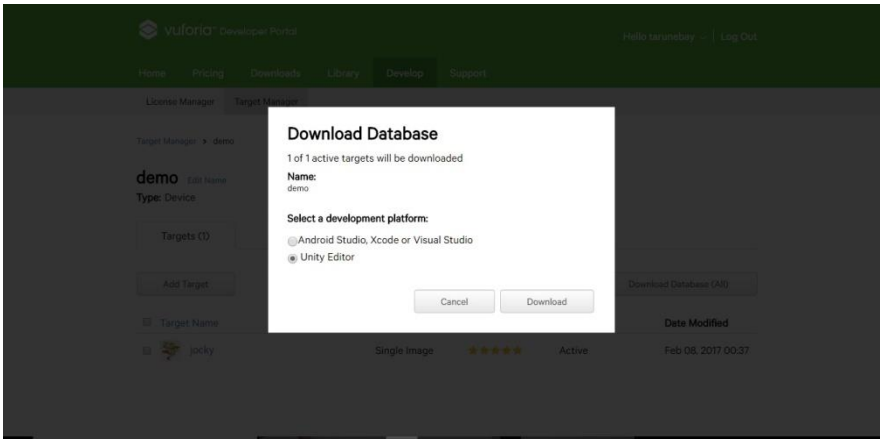
5. After opening Project, import Vuforia Plugin by clicking on

Assets->Import Package->Custom Package



6. Now setup an Image as an **Marker** and check its marker points(See **Annexure 3**)

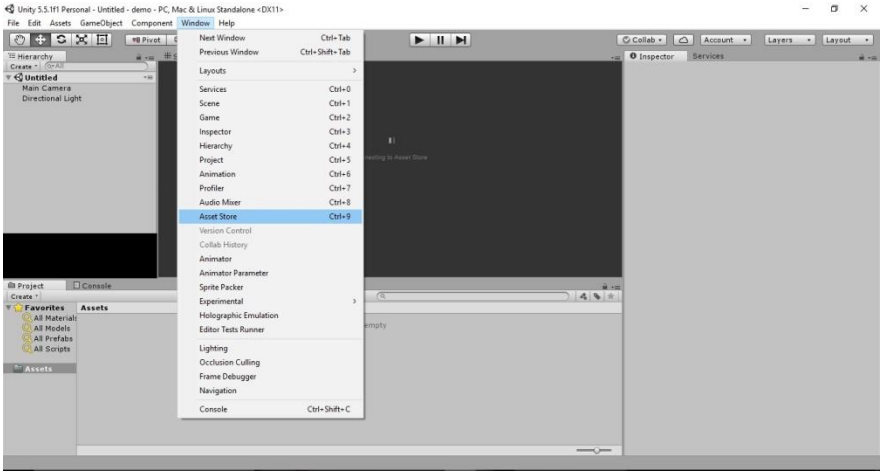
7. Go to **developer.vuforia.com** , click on **Develop** followed by **Target Manager**. Select the **database** you had created and click on **Download Database**, select **Unity Editor** option.



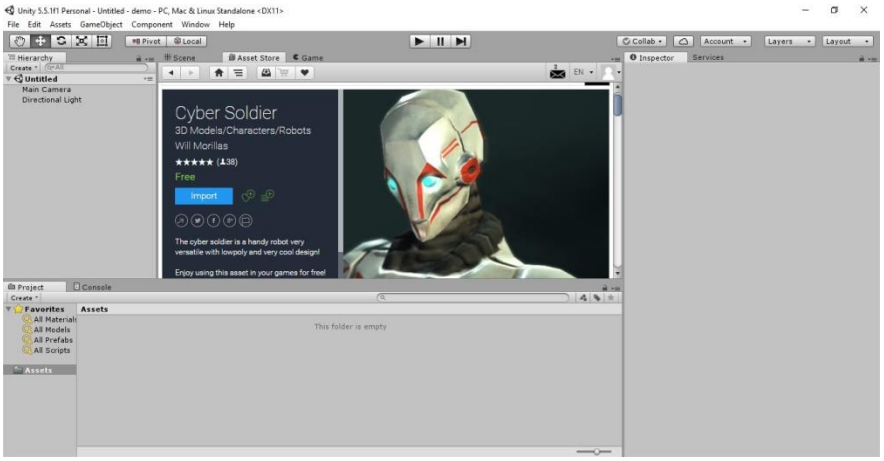
8. After downloading, **import** the database by following same steps as in Step 5.

9. We need a 3D object now to augment. To get a 3D object click

Window->Asset Store

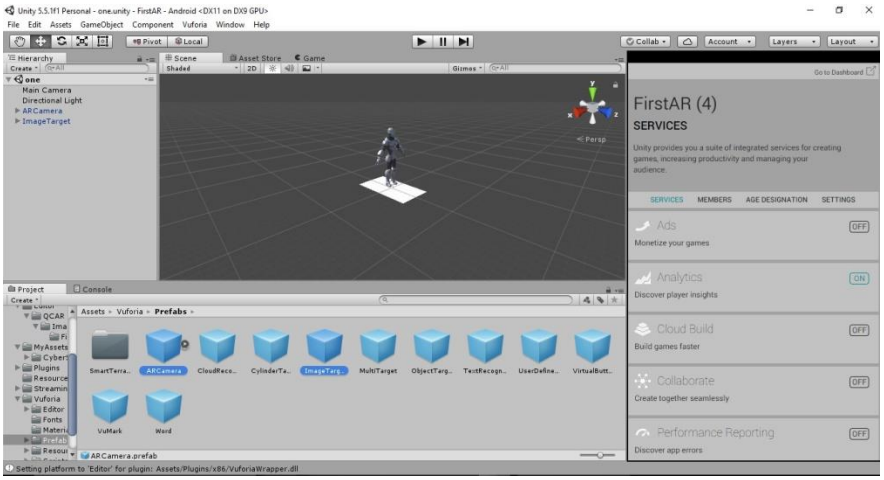


10. Search for **Cyber Soldier** and click on **Download.**

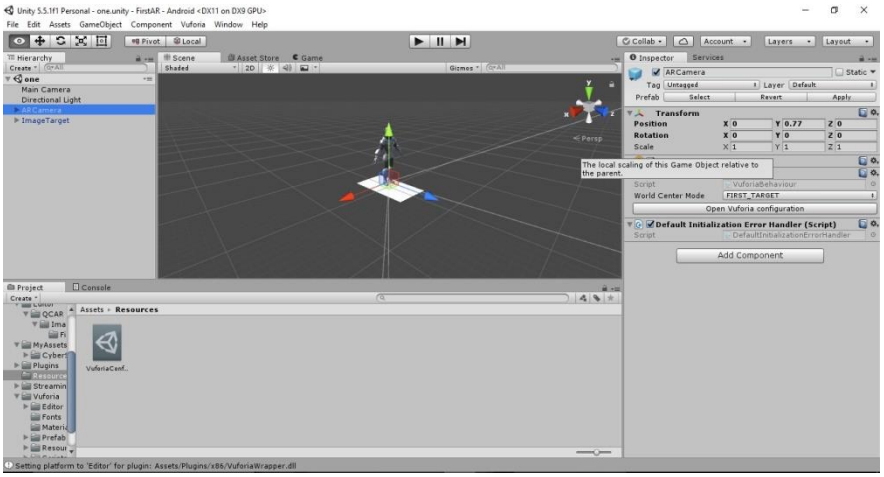


11. It will automatically **import Cyber Soldier files.**

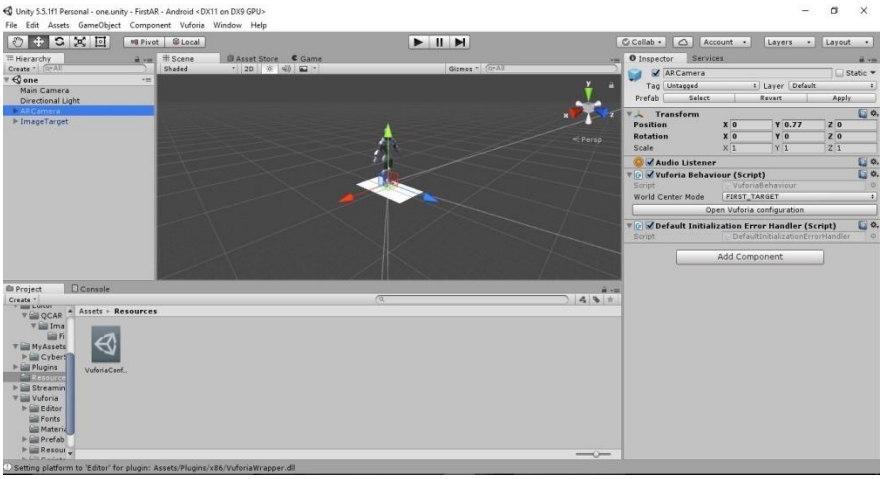
12. Now, on the bottom left corner, you will find **Assets**, go to **Vuforia the Prefabs** and drag **AR camera** and **image target** to scene.



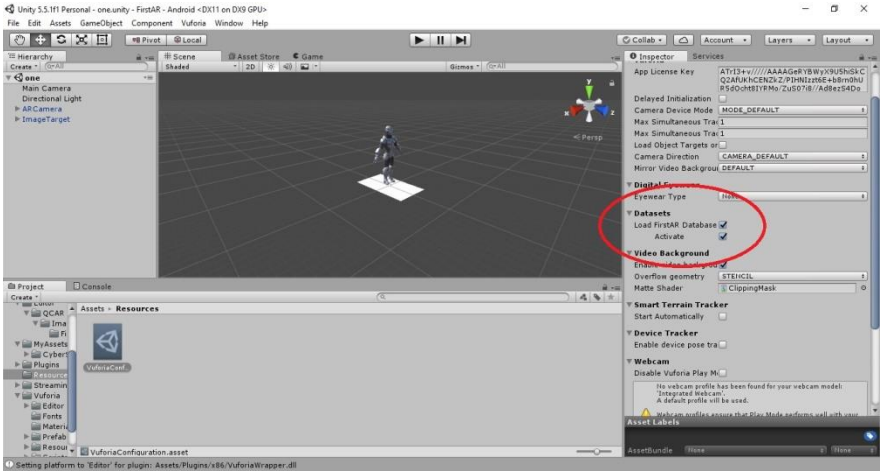
13. Click on **AR camera** from **Hierarchy tab** on top left corner. Set position in **Inspector tab** available on top right corner. Mark positions as (0,0,0).



14. In **Inspector** open **Vuforia configurations**. It will ask for **App License Key.** Paste the License Key you copied earlier.



15. Under **Datasets tab** check **Load Database** and **activate**.



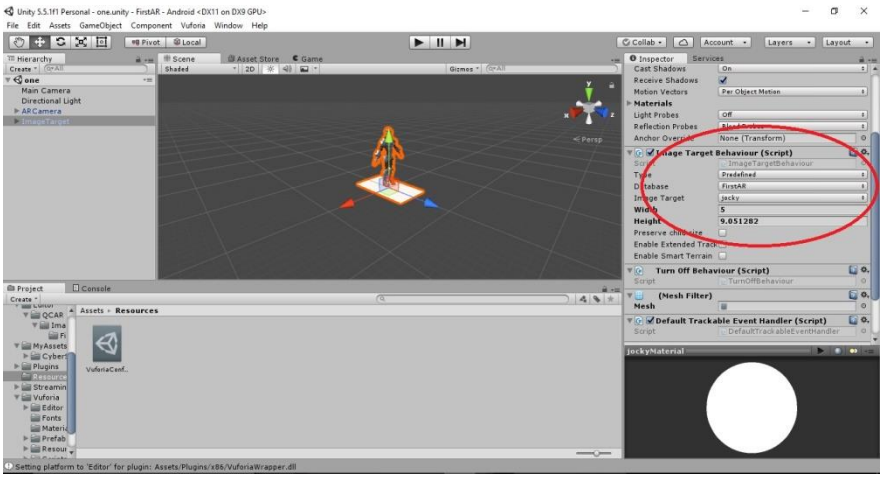
16. Click **Image Target** from **Hierarchy tab** and go to **Inspector**. Set positions as (0,0,0).

Under **Image Target Behavior** set,

Type = Predefined

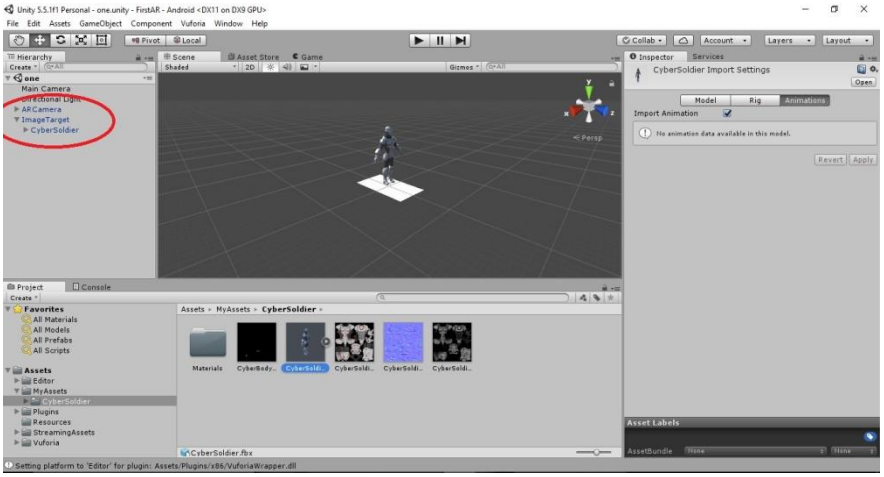
Database = name of your database created earlier

Image Target = Image that you uploaded earlier as Marker.

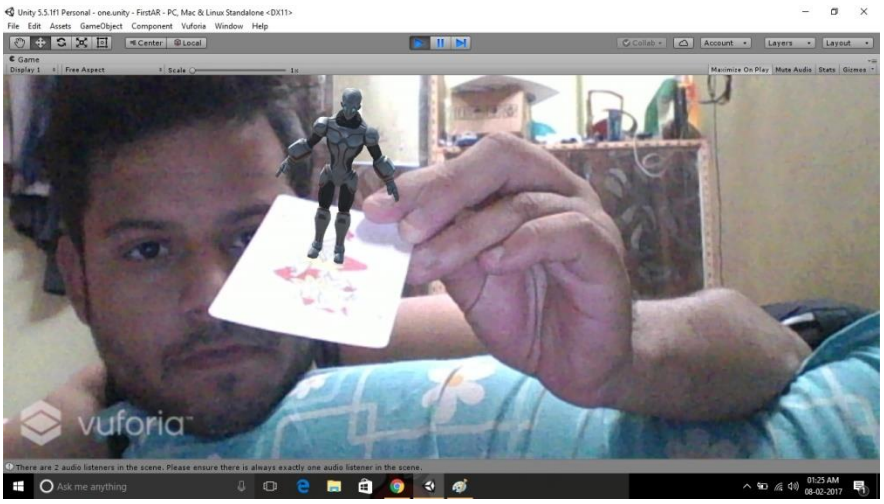


17. From **Assets**(in bottom left corner), Click on **My Assets->Cyber Soldier.** Drag the **Cyber Soldier** to the **Hierarchy** under **Image Target**.(Make sure Cyber Soldier is added under Image Target and not as an individual component) .

18. From **Hierarchy** select **Cyber Soldier**. Select positions as (0,0,0), where scale is for the size of the Augmented Soldier.



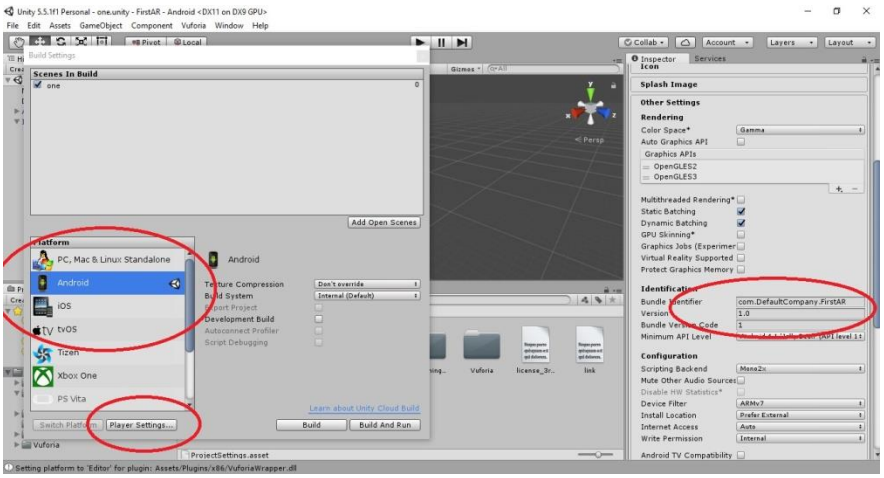
19. Above the scene click on **Play** and unleash your soldier.



20. To export it as **an APK** go to

File->Build Settings

Click on **Add Open Scene**[make sure you have saved the scene previously]. Click on **Android and Player Settings**. Set **Bundled Identifier** and **minimum SDK level**.



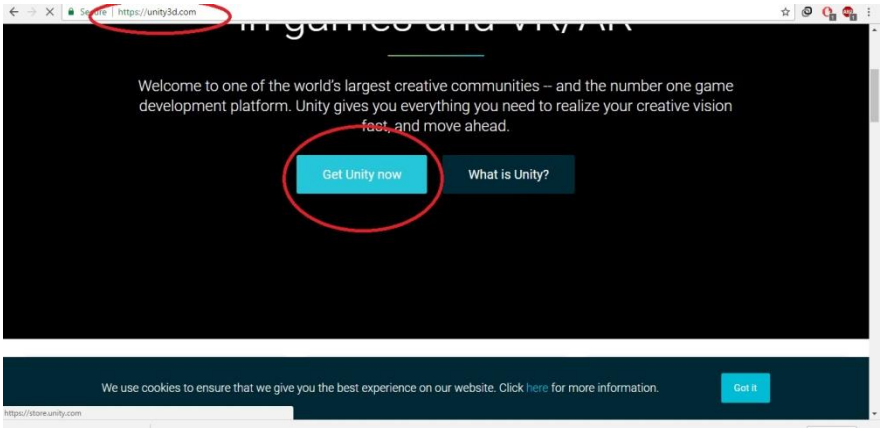
21. Now connect your **Android device** under **USB debugging mode**(See **Annexure 4**)

22. Click on **Build and Run.**

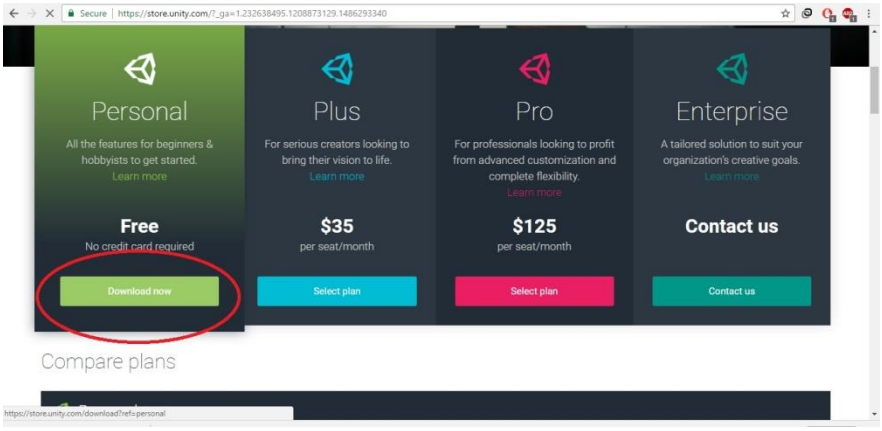
Annexure 1

To Download Unity 3D

1. Go to unity3d.com.
2. Click on Get Unity.



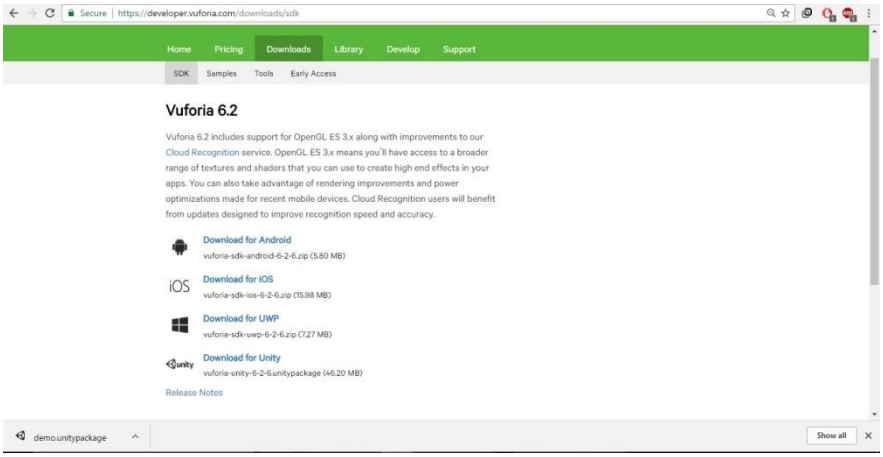
3. Click on Personal followed by Download now.



Annexure 2

To download Vuforia Plugin

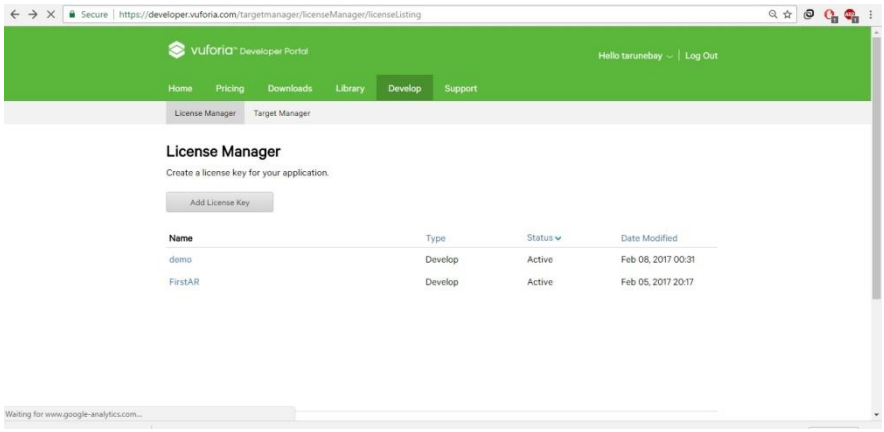
1. Go to developer.vuforia.com.
2. Under Downloads tab click on Download for Unity.



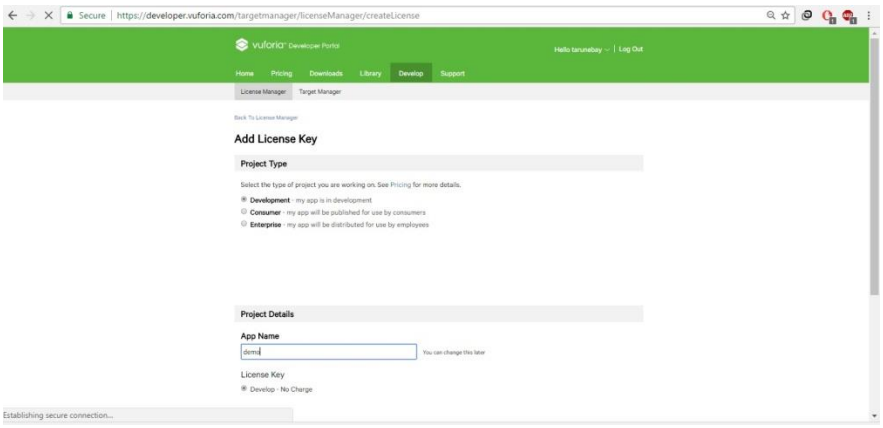
Annexure 3

To upload a Marker image and check its Marker points

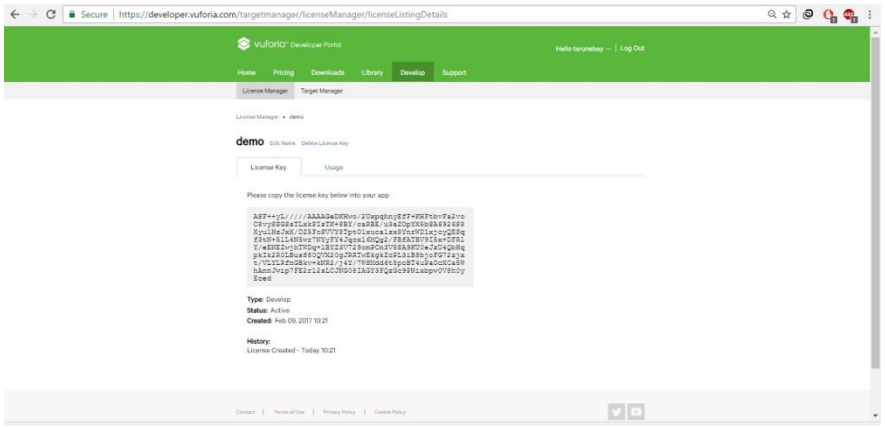
1. Log on to developer.vuforia.com
2. Register a new account with some initial details required.
3. Go to Develop, select Add License Key.



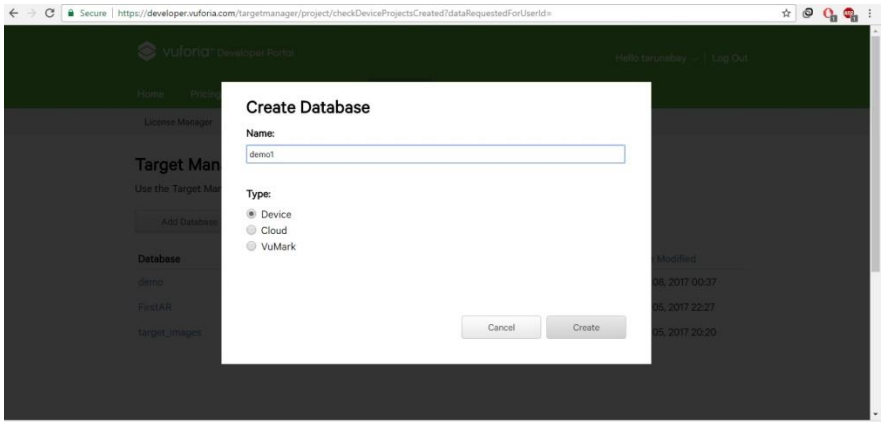
4. Click on Development for a Free Account.



5. Click on demo and copy the key(You will need it later).



7. Now go to Target Manager and click on Add Database

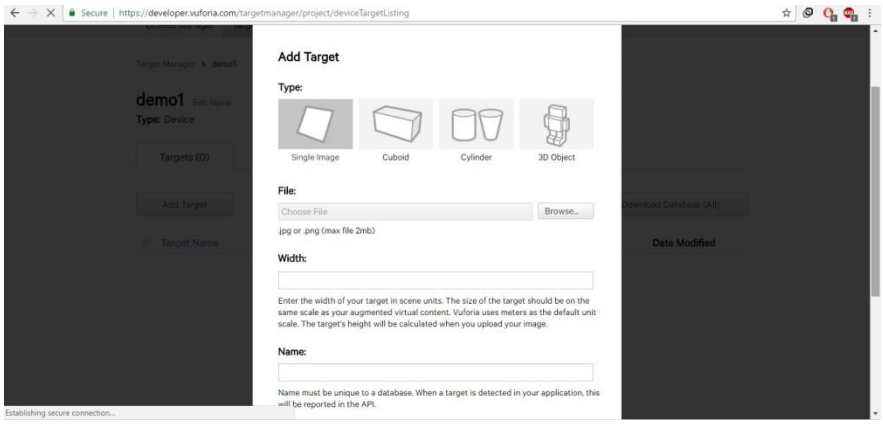


8. Give Some basic Details and click on Device, Click Create.

9. Now under the database Header, we will see the newly created database, The targets for this database will be 0 i.e. there will be no image target set till now.

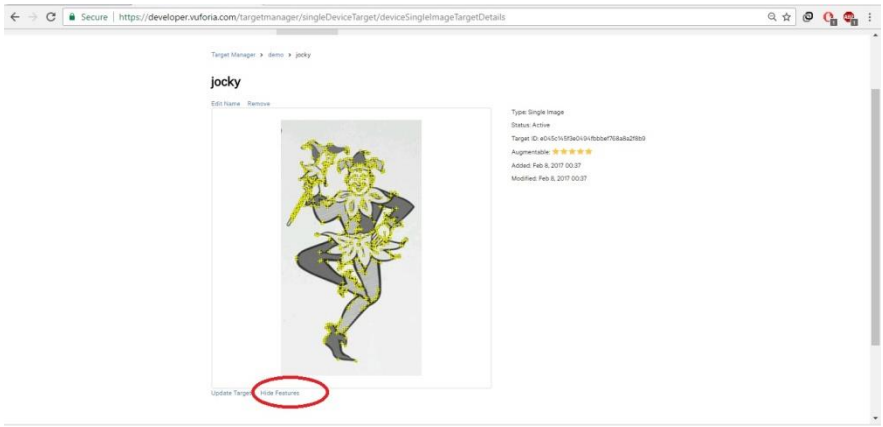
10. Click in the database mentioned in the above step and click on Add Target.

11. Since its the beginning add single image set the width as 5 and click add.



12. Now under the Target Name Header, you will see the image you just uploaded, select that image.

13. You will see your image under it there will be an option of **Show Feature**. Select it to see the marker points.



You can also see the augmentable score on the right side of the image.

Annexure 4

To setup USB Debugging in Android devices

1. Go to settings in Android Device.
2. Go to About Phone.
3. Click on Build No. tab five to six times, till a toast appears saying "You are now a Developer"
4. Then go back, you will see Developer option.
5. Open it and enable USB Debugging.