



**Development guide for the
Igniter Bee augmented reality
mobile application**

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Introduction

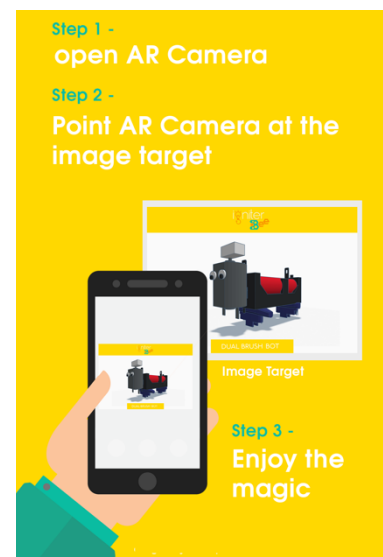
Igniter Bee is a **monthly subscription** to develop creativity and innovativeness of child around the globe. Every month, 2 activities are delivered to the subscribers' doorstep. A pack contains one **physical maker activity** and one computer programming guide.

When the child does the physical maker activity, he /she might find it **difficult to visualize** the what the end product of the activity should look like by look only at a 2D image. **Igniter bee AR application** is a possible solution to this. The child will be able to download this mobile application from the Android Play store or Apple App store, and view the model he/she has the create in a 3D manor. Furthermore, the child could use the app to access the tutorial related to a specific activity in the app it self.

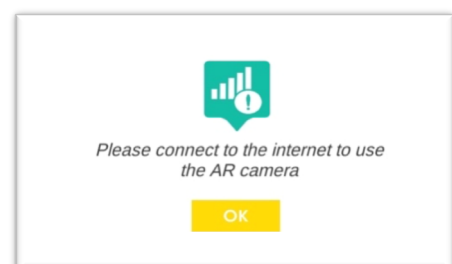
How to use the Application?

The user will be provided with an image target along with the pack he/she receives. To view the 3d model, the user simply has to **open the AR camera** in the app and **point at the image target**. The image related 3d model will be augmented n top of the target image

After the 3d image is augmented on the target, **a button will appear** in the button of the screen. This button can be pressed to **view the tutorial** related to the specific activity



Note : The mobile should be connected to the internet in order to open and use the AR camera. If not the following pop up will be shown.



Technologies used



Unity: Used to develop the mobile application (UI + Logic using C# scripts).



Vuforia library: This is used to make a 3D object augment on top of an image target and for cloud recognition of image targets.



AWS S3 Bucket: S3 bucket is used to store asset bundles (compressed 3D objects). And also used to store the html tutorials

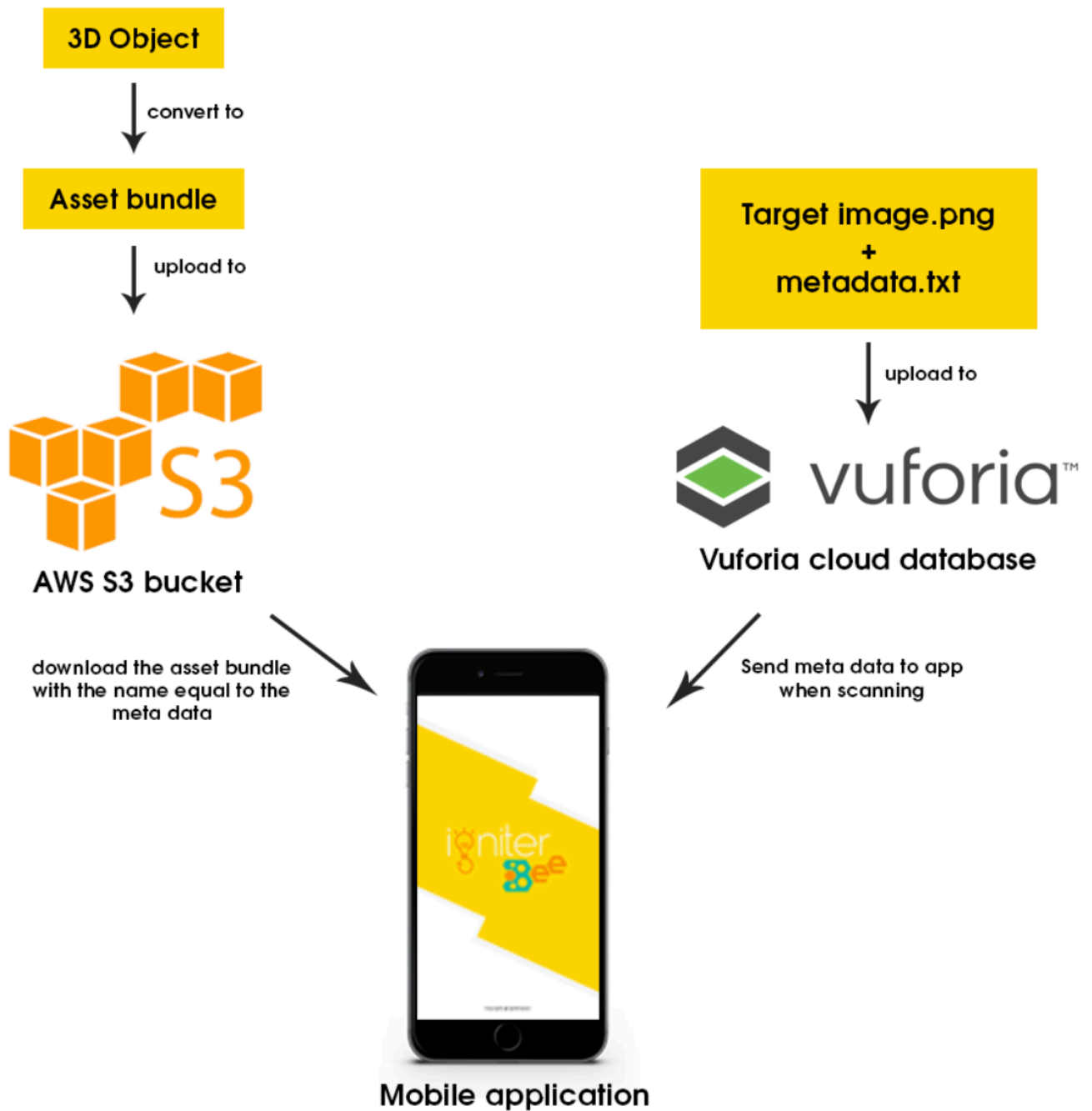


Tinkercad: This is used to create 3D models



Android/ IOS SDK: To build the project to run on a specific platform.

Architecture of the application (augmenting a 3d object)



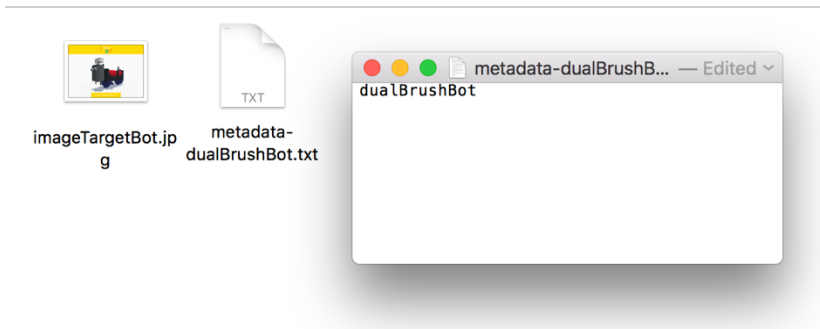
UI of the application



Adding a new image target to Vuforia

What is needed:

- 1) A png or jpg/jpeg image (Your target image)
- 2) A .txt file containing the name of the object (**metadata**). This metadata name is really **important** (Will will look at in the future pages of this guide).

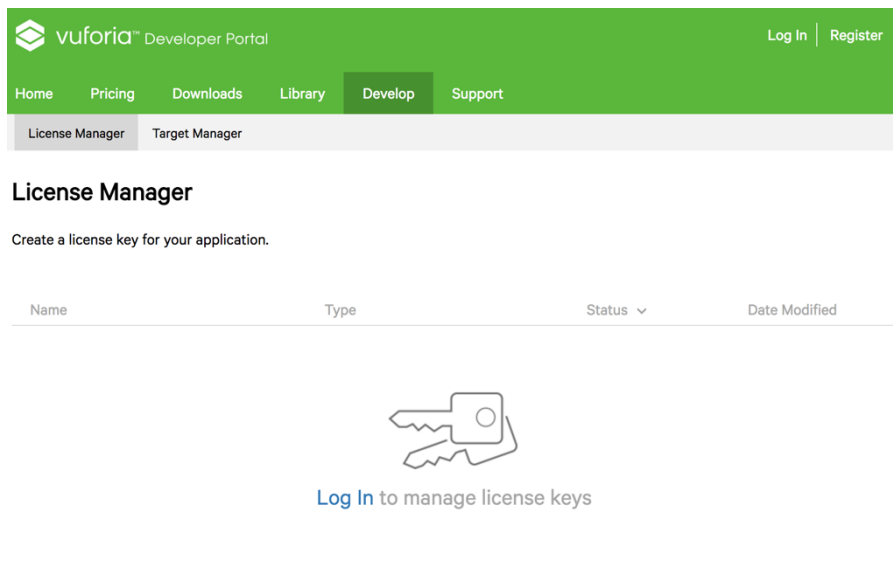


To add image targets, you have to:

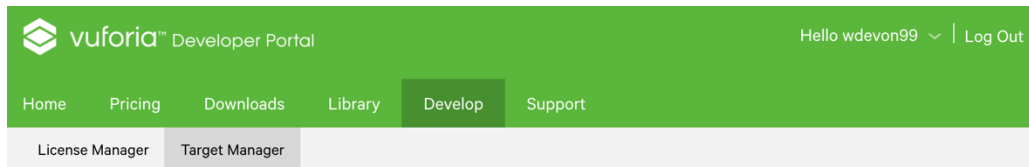
Step 1- Login to your vuforia developer portal.

Link : <https://developer.vuforia.com/license-manager> Adding a new 3d model

Step 2- Go to develop tab

A screenshot of the Vuforia Developer Portal. The top navigation bar is green with the Vuforia logo and 'Developer Portal' text. On the right, there are 'Log In' and 'Register' links. Below the navigation bar, there are tabs for 'Home', 'Pricing', 'Downloads', 'Library', 'Develop', and 'Support'. Underneath, there are sub-tabs for 'License Manager' and 'Target Manager'. The main content area is titled 'License Manager' and contains the text 'Create a license key for your application.' Below this is a table with columns for 'Name', 'Type', 'Status', and 'Date Modified'. At the bottom, there is a key icon and the text 'Log In to manage license keys'.

Step 3- After you login, go to the **target manager** tab and select your **cloud database** from the databases section and click on it.



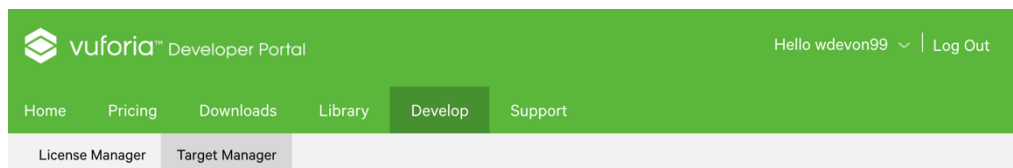
Target Manager

Use the Target Manager to create and manage databases and targets.

Add Database

Database	Type	Targets	Date Modified
secondCloud	Cloud	5	Jan 16, 2018 12:10
targetDbOne	Device	1	Dec 20, 2017 07:45
test	Device	0	Dec 22, 2017 10:05
testcloud	Cloud	4	Jan 01, 2018 05:30

Step 4- Click the **Add Target** button



Target Manager > secondCloud

secondCloud [Edit Name](#)

Type: Cloud

License Key: Second Key

Targets (5) [Database Access Keys](#)

Add Target

Search by target name or target ID

<input type="checkbox"/>	Target Name	Rating	Recos <input type="checkbox"/>	Status <input type="checkbox"/>	Date Modified <input type="checkbox"/>
<input type="checkbox"/>	imageTargetMan	★★★★★	236	Active	Jan 16, 2018 12:10
<input type="checkbox"/>	car	★★★★★	111	Active	Jan 16, 2018 12:06
<input type="checkbox"/>	scribbleBot	★★★★☆	5	Active	Jan 15, 2018 10:03
<input type="checkbox"/>	imageTargetBot	★★★★☆	316	Active	Jan 01, 2018 21:18
<input type="checkbox"/>	targetFan	★★★★☆	213	Active	Jan 01, 2018 20:54

Step 5- You will get a pop up window, select the image target.png/.jpg/.jpeg and the metadata.txt file from your local storage. You can give any width and any name for the image target. Then click the add button(Your target image will get uploaded)

Add Target

Target Image File:

Choose File

.jpg or .png (max file 2mb)

Width:






Enter the width of your target in scene units. The size of the target should be on the same scale as your augmented virtual content. Vuforia uses meters as the default unit scale. The target's height will be calculated when you upload your image.

Metadata Package: (Optional)

max file 2mb

Name:

You can view the added targets , as shown in the screenshot below:

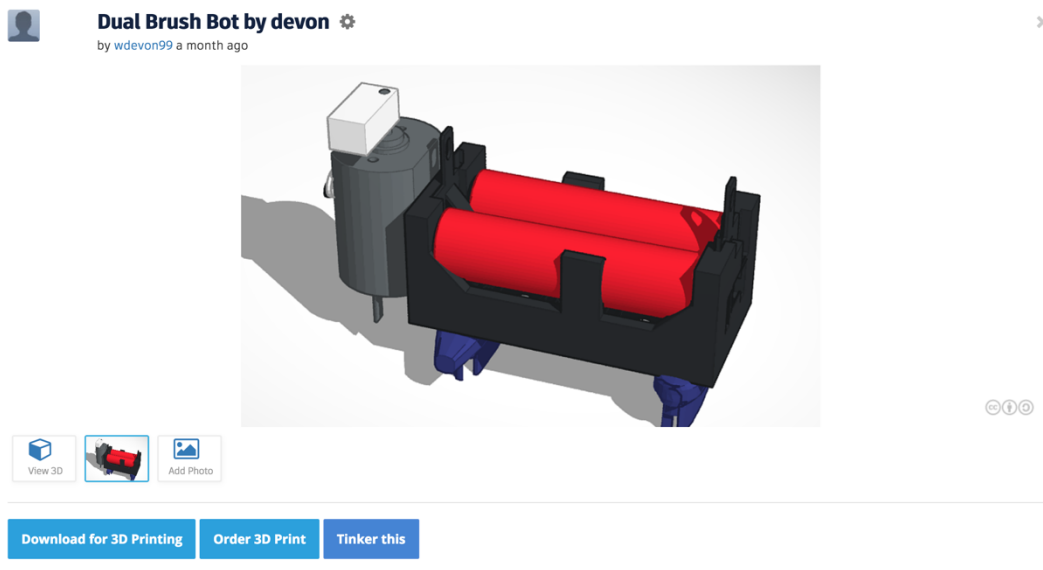
<input type="checkbox"/>	Target Name	Rating	Recos <input type="button" value="v"/>	Status <input type="button" value="v"/>	Date Modified <input type="button" value="v"/>
<input type="checkbox"/>	 imageTargetMan	★★★★★	236	Active	Jan 16, 2018 12:10
<input type="checkbox"/>	 car	★★★★★	111	Active	Jan 16, 2018 12:06
<input type="checkbox"/>	 scribbleBot	★★★★☆	5	Active	Jan 15, 2018 10:03
<input type="checkbox"/>	 imageTargetBot	★★★★☆	316	Active	Jan 01, 2018 21:18
<input type="checkbox"/>	 targetFan	★★★★☆	213	Active	Jan 01, 2018 20:54

Adding a new 3d model

Downloading 3d model from Tinkercad

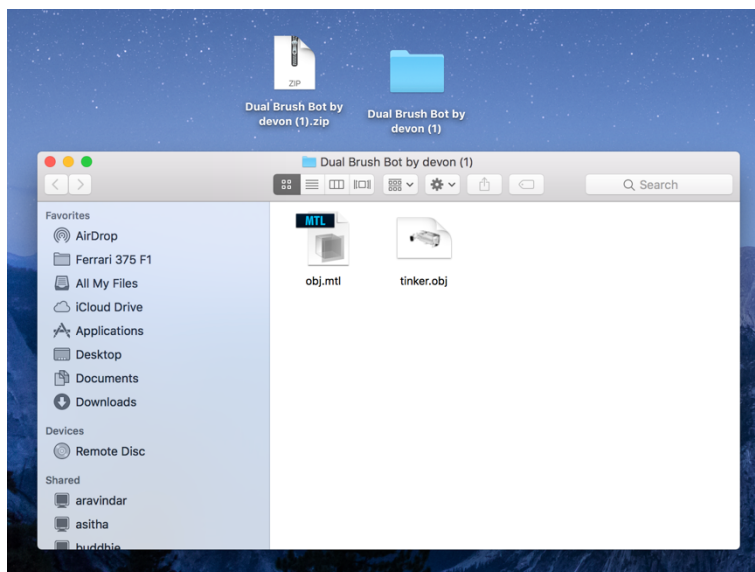
Step 1- Login in to **Tinkercad** account and click on the model u made and click download for 3D printing.

Link: <https://www.tinkercad.com/>



Step 2- Download it as an **.OBJ** file

You will get a zip file in your downloads, unzip it to get a folder like this containing two files:



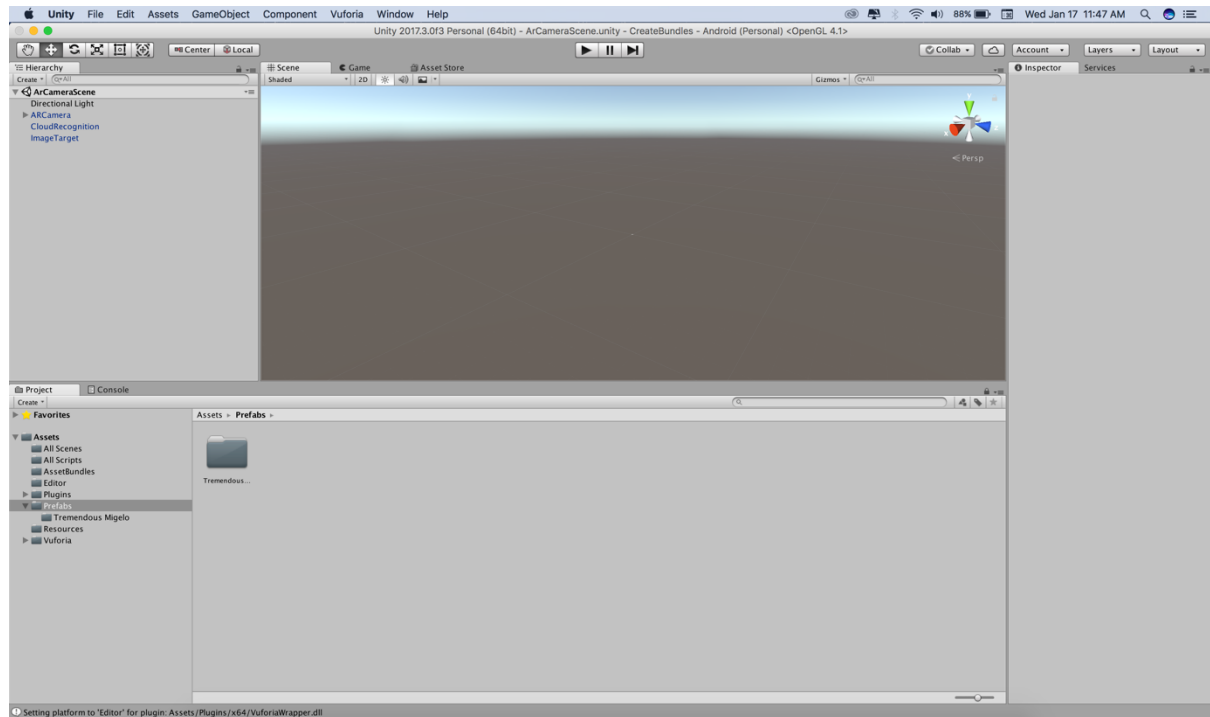
***We will use this folder later on in this guide**

Creating asset bundle

After you clone the project from Github, there will be a folder called **“Asset bundle creator project”**

Step 1- Open that folder and you will find a unity project name **“CreateBundles”**. Open it in Unity.

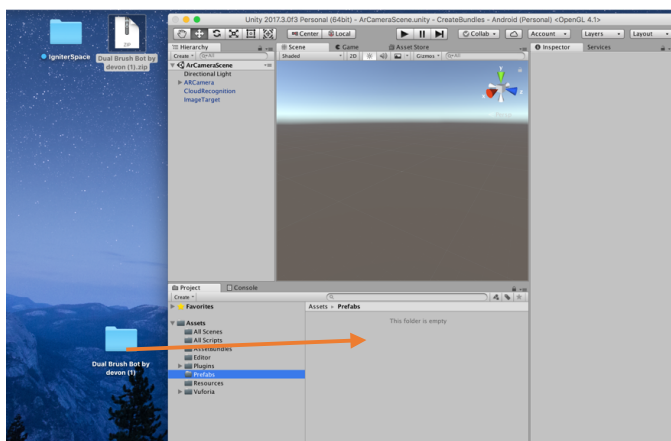
You should see a screen like this:



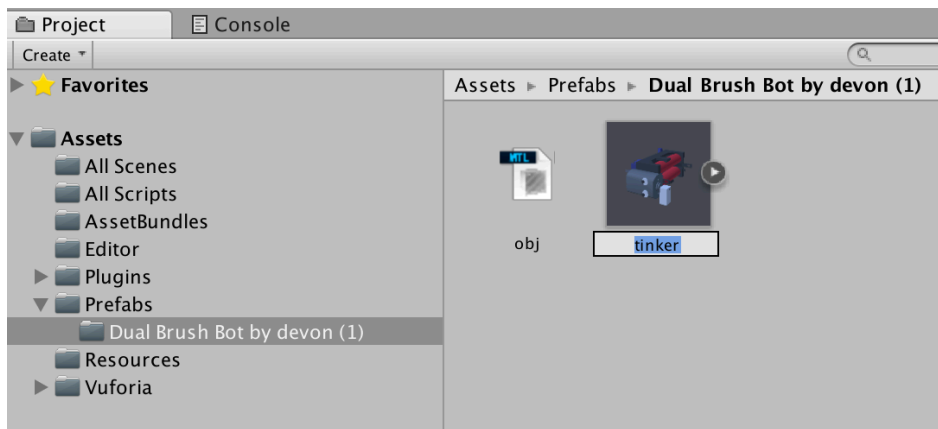
Step 2- On the bottom left, you will see a file structure, with Assets as the root folder (refer the screen shot above). Click on the **‘Prefabs’** folder

Step 3- If there are any folders inside the prefabs folder, right click and **delete** them all

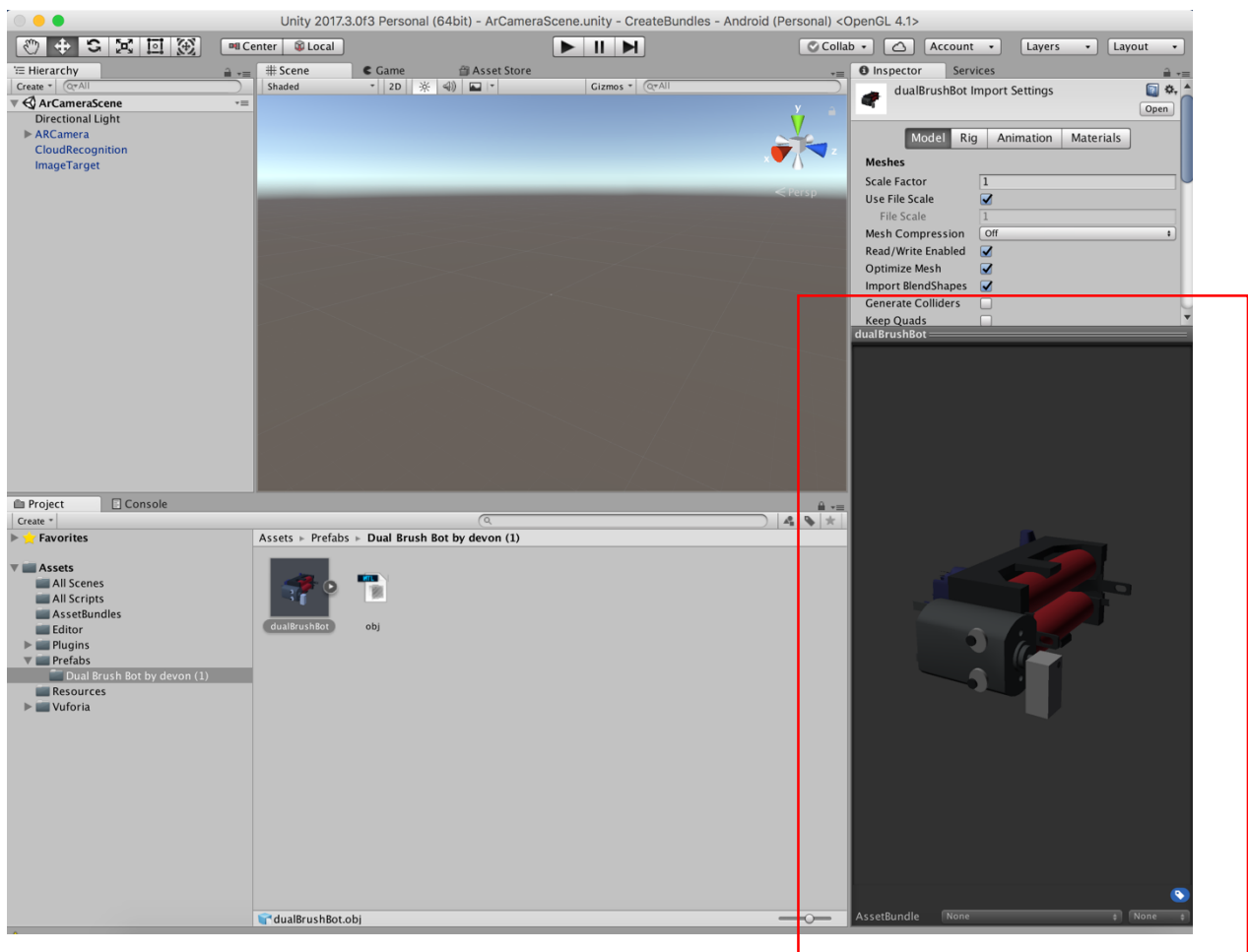
Step 4- Drag and drop the folder you got from Tinkercad , inside the **Prefabs** folder.



Step 5- Rename the .obj file to the **EXACT** name you gave in the image target metadata (**the name in the .txt file which was uploaded to Vuforia along with the target image**)

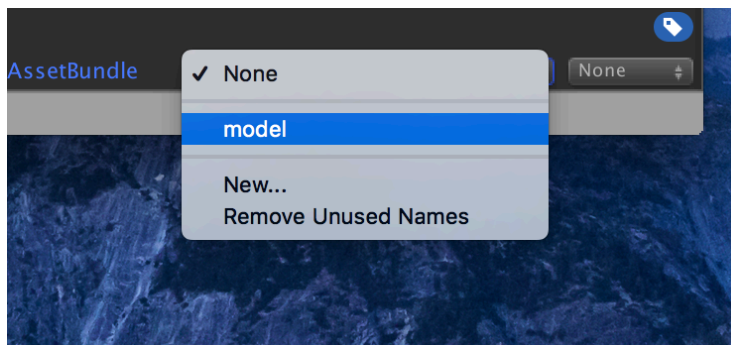
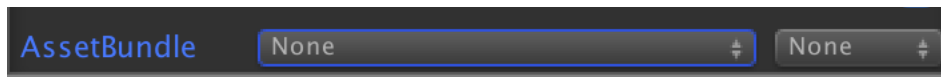


Step 6- Click on the .obj file and a panel showing the object will appear on the **bottom right**, as show below:

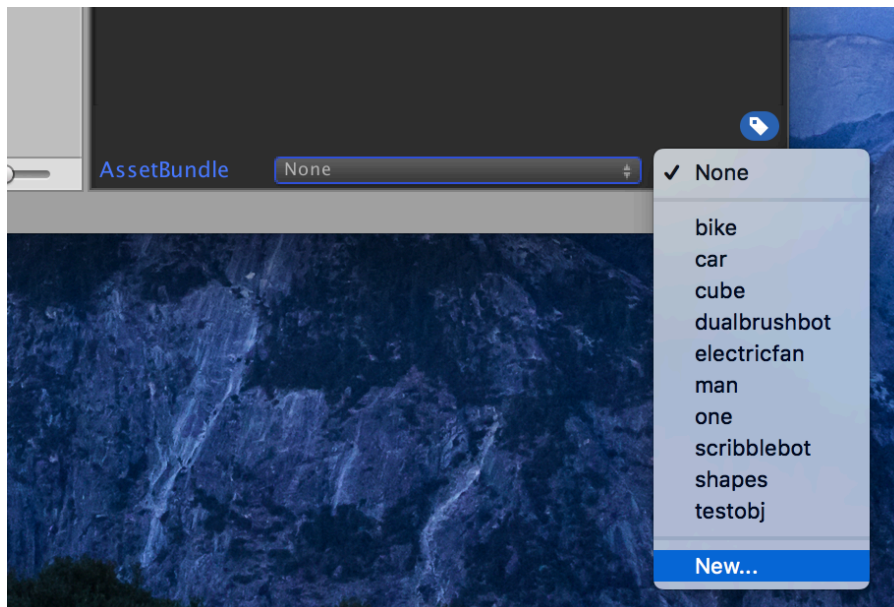


Step 7- On the bottom of the panel shown above , there will be a label called 'AssetBundle'. And there will be two drop downs next to it.

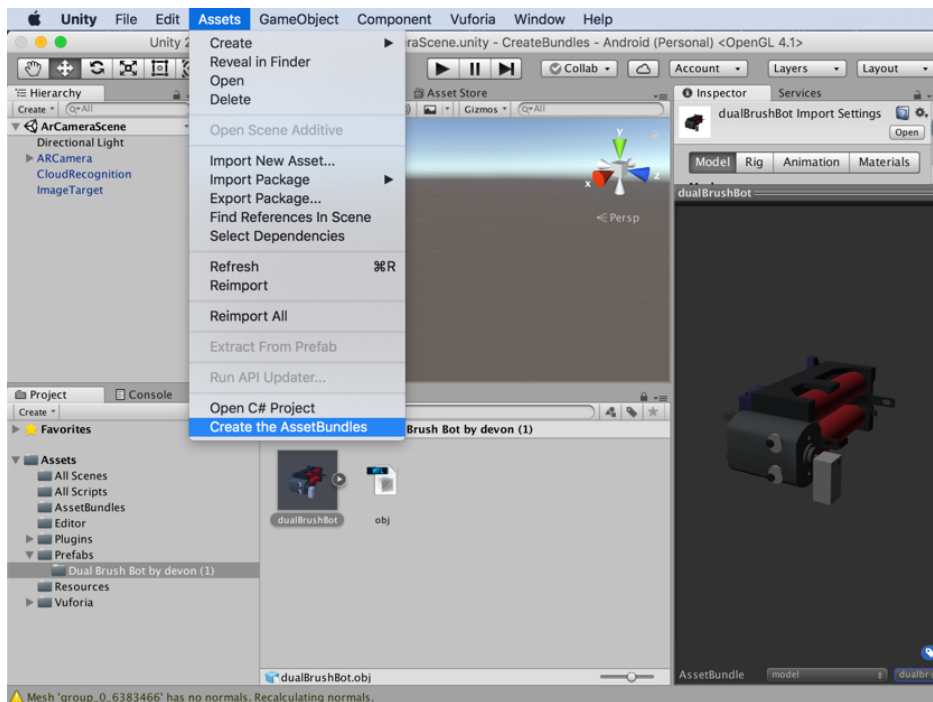
Click on the **first** drop down, and select 'new' and type 'model' or if it is already available, just select 'model'



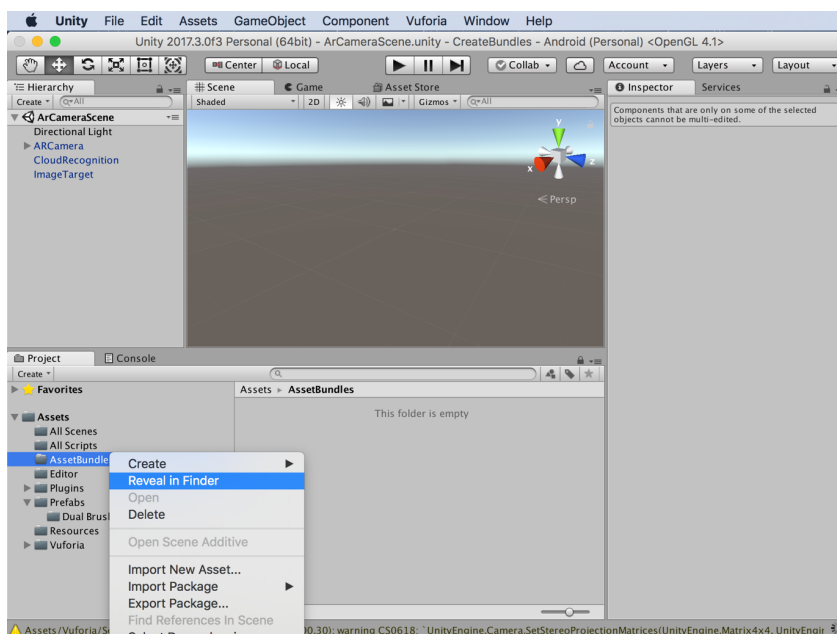
Step 8- Then click on the **second** drop down and click new and type the **EXACT** name of the object (.obj that u renamed)



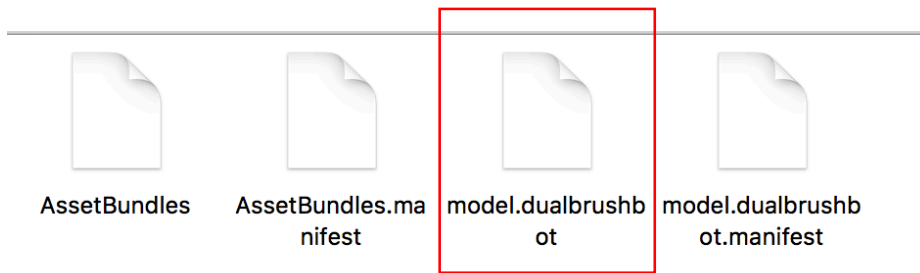
Step 9- After that is done, click on the **'Assets'** on the top tool bar and select the option at last which says **'Create the AssetBundles'**



Step 10- Then you have right click the **'AssetBundle'** folder on the **bottom left** file structure and click **'Reveal in finder'**



You will get four files (or more if there are files in the folder already) like show below.



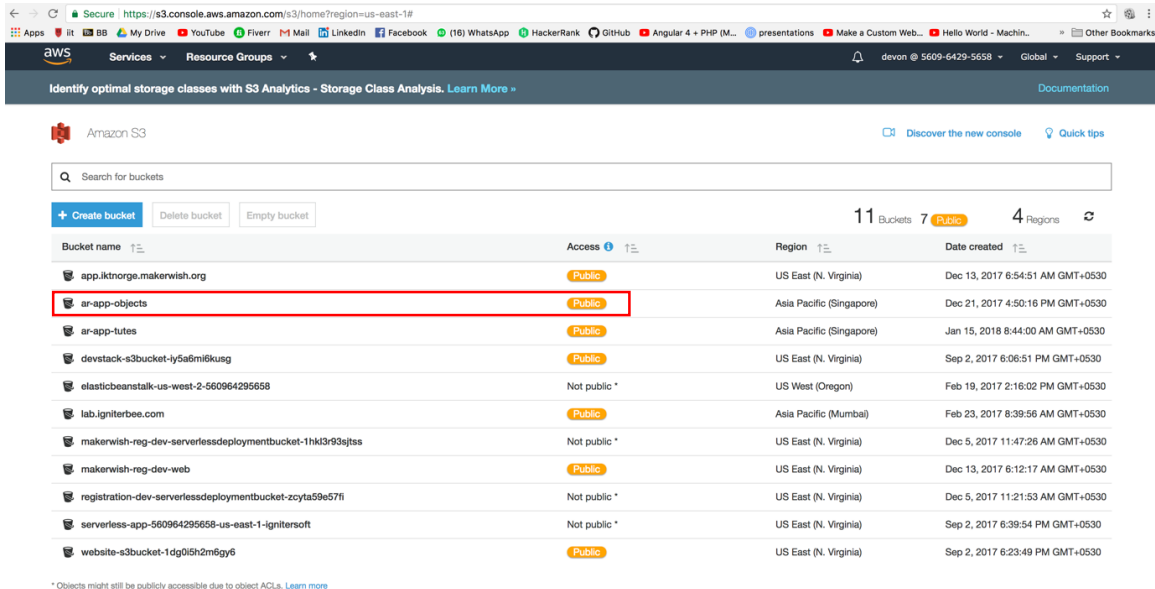
Step 11- Select the file which has the name **model.nameOfTheObject ONLY**.

The **other files** will **not** be used. The selected file can be copied to a accessible location in the local storage (eg :desktop) , because it needs to be **uploaded** to a **AWS S3 bucket**

Uploading to the S3 bucket

Step 1- Login to AWS console and go to the s3 buckets section

Step 2- Select the 'ar-app-objects' bucket from the list

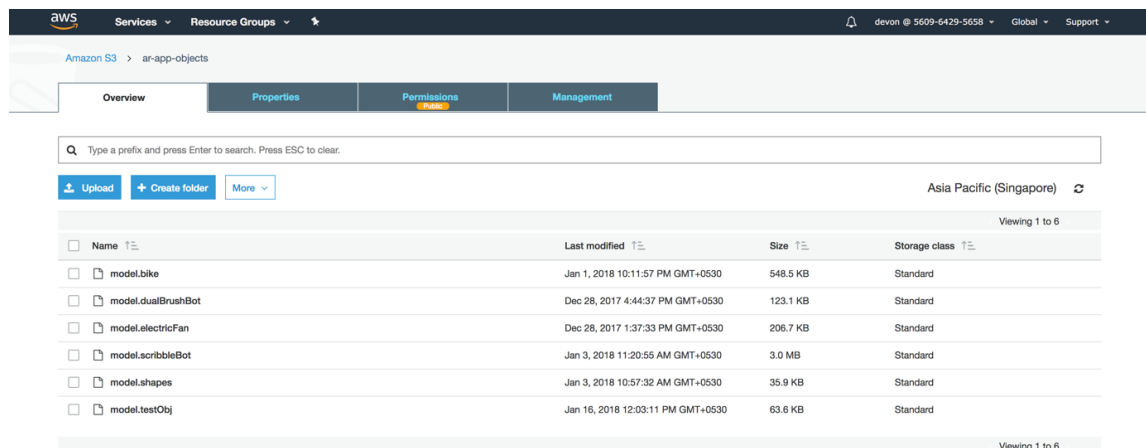


The screenshot shows the AWS S3 console interface. At the top, there's a search bar and navigation buttons like 'Create bucket', 'Delete bucket', and 'Empty bucket'. Below that, a table lists various S3 buckets. The 'ar-app-objects' bucket is highlighted with a red border. The table columns are 'Bucket name', 'Access', 'Region', and 'Date created'. The 'ar-app-objects' bucket is located in the Asia Pacific (Singapore) region and is publicly accessible.

Bucket name	Access	Region	Date created
app.ikt Norge.makerwish.org	Public	US East (N. Virginia)	Dec 13, 2017 6:54:51 AM GMT+0530
ar-app-objects	Public	Asia Pacific (Singapore)	Dec 21, 2017 4:50:16 PM GMT+0530
ar-app-tutes	Public	Asia Pacific (Singapore)	Jan 15, 2018 8:44:00 AM GMT+0530
devstack-s3bucket-ly5a6m6kuug	Public	US East (N. Virginia)	Sep 2, 2017 6:06:51 PM GMT+0530
elasticbeanstalk-us-west-2-560964295658	Not public *	US West (Oregon)	Feb 19, 2017 2:16:02 PM GMT+0530
lab.igniterbee.com	Public	Asia Pacific (Mumbai)	Feb 23, 2017 8:39:56 AM GMT+0530
makerwish-reg-dev-serverlessdeploymentbucket-1hk13r93jts	Not public *	US East (N. Virginia)	Dec 5, 2017 11:47:26 AM GMT+0530
makerwish-reg-dev-web	Public	US East (N. Virginia)	Dec 13, 2017 6:12:17 AM GMT+0530
registration-dev-serverlessdeploymentbucket-zcyta59e57fi	Not public *	US East (N. Virginia)	Dec 5, 2017 11:21:53 AM GMT+0530
serverless-app-560964295658-us-east-1-ignitersoft	Not public *	US East (N. Virginia)	Sep 2, 2017 6:39:54 PM GMT+0530
website-s3bucket-1dg0lsh2m6gy6	Public	US East (N. Virginia)	Sep 2, 2017 6:23:49 PM GMT+0530

Step 3- Click the upload button and upload the single file (asset bundle) you selected (saved to the desktop) in the previous part of this guide. **Make sure you make the file PUBLIC to everyone.**

You can view all the uploaded asset bundle now:



The screenshot shows the AWS S3 console interface for the 'ar-app-objects' bucket. The 'Permissions' tab is selected, showing the bucket is public. Below that, there's a search bar and navigation buttons like 'Upload', 'Create folder', and 'More'. A table lists the contents of the bucket, including files like 'model.bike', 'model.dualBrushBot', 'model.electricFan', 'model.scribbleBot', 'model.shapes', and 'model.testObj'. The table columns are 'Name', 'Last modified', 'Size', and 'Storage class'.

Name	Last modified	Size	Storage class
model.bike	Jan 1, 2018 10:11:57 PM GMT+0530	548.5 KB	Standard
model.dualBrushBot	Dec 28, 2017 4:44:37 PM GMT+0530	123.1 KB	Standard
model.electricFan	Dec 28, 2017 1:37:33 PM GMT+0530	206.7 KB	Standard
model.scribbleBot	Jan 3, 2018 11:20:55 AM GMT+0530	3.0 MB	Standard
model.shapes	Jan 3, 2018 10:57:32 AM GMT+0530	35.9 KB	Standard
model.testObj	Jan 16, 2018 12:03:11 PM GMT+0530	63.6 KB	Standard

That's it :)

For any inquiries -

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