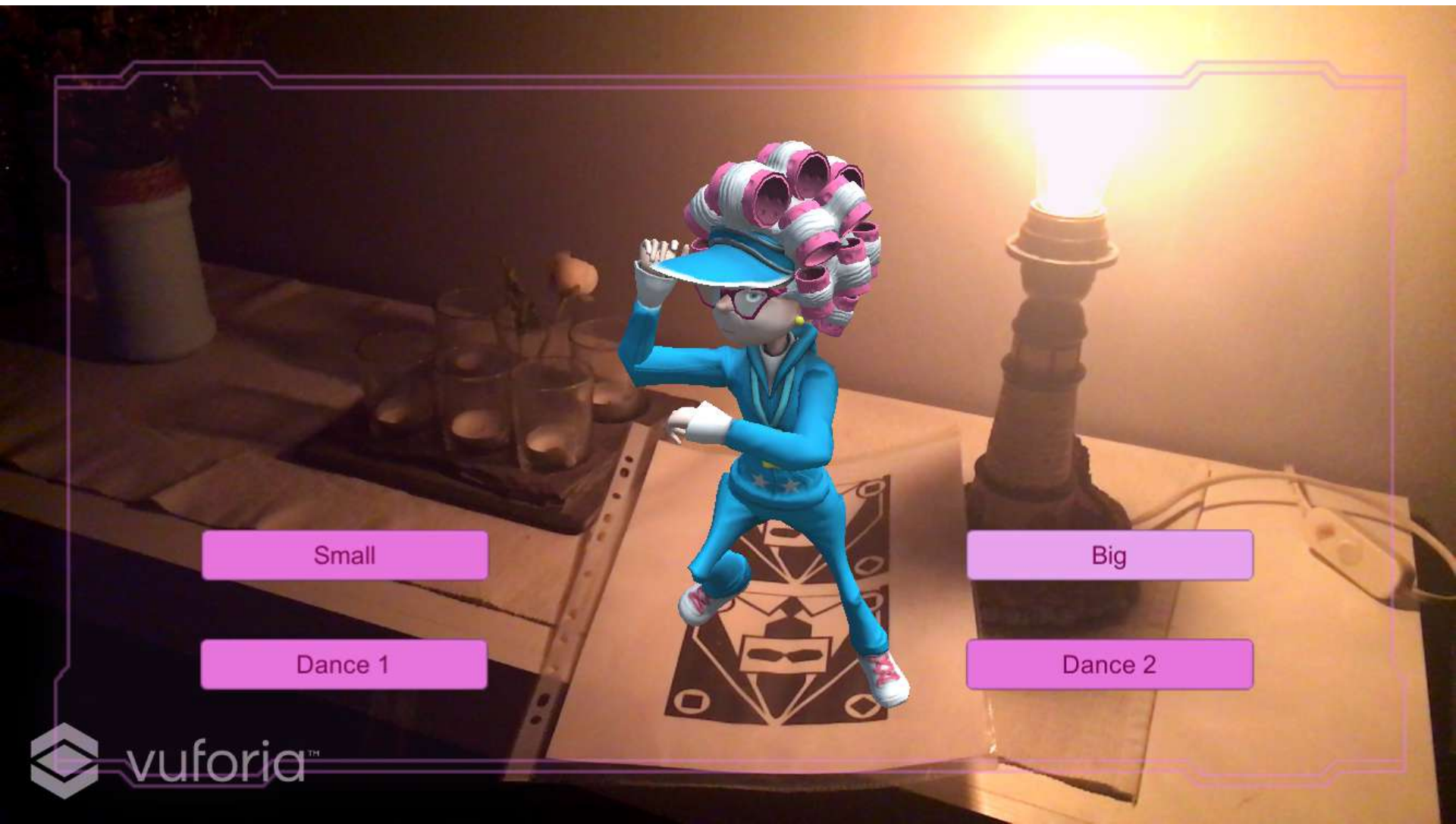
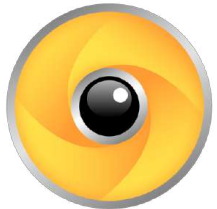


Lab 6.1. First AR Exercises: Wikitude, Vuforia & Mixamo



Augmented Reality Browsers



No programming needed

What is an AR Browser?

Besides the possibility of developing individual AR-Apps, AR contents can also be published on existing platforms.

They perform standardise AR features and they allow to easily create and manage **contents**



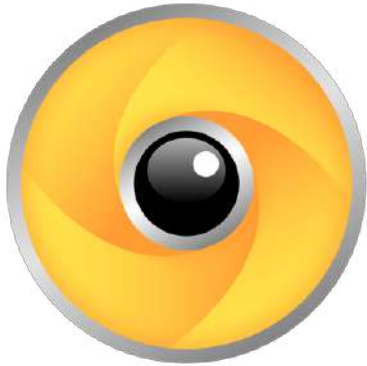
What is an AR Browser?

Functionality is based on 2D image markers, 3D object markers, SLAM methods (simultaneous localization and mapping) or GPS tracking.

Overlapping of contents: texts, 2D images, videos and 3D objects.



Available AR Browsers



Wikitude (2008)



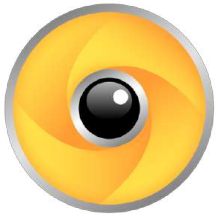
Junaio (2009) -> 💀



Aurasma (2011) -> HP Reveal



Layar (2009) -> BlippAR (2011)



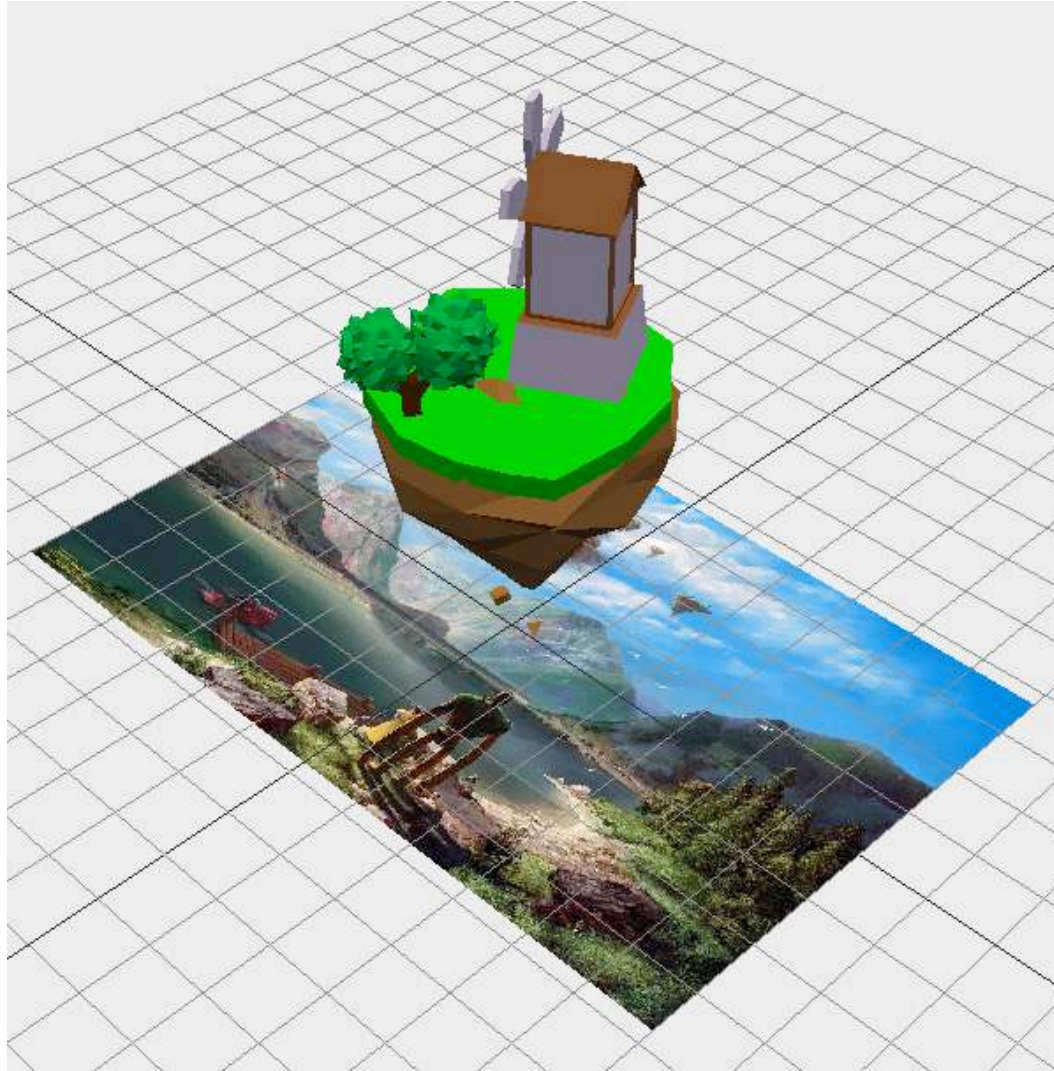
Wikitude



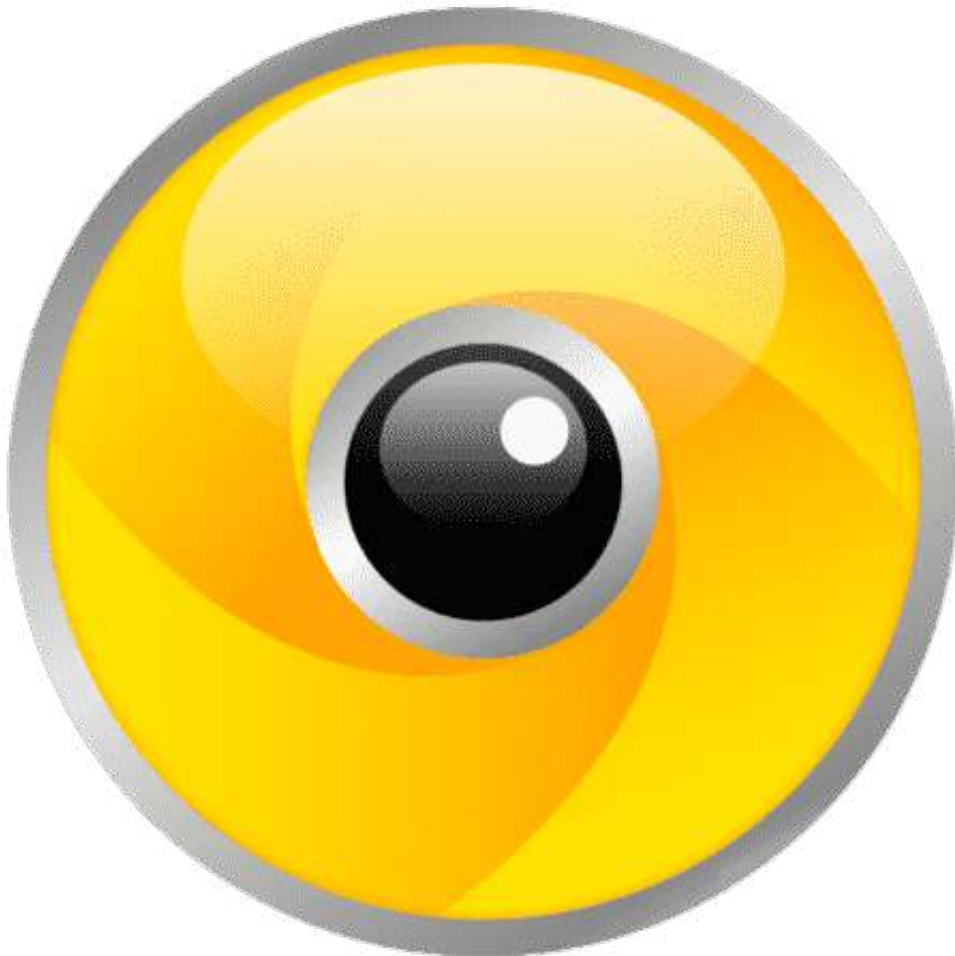
Video: Wikitude (boardshop example)

Part 1. Introducing Marker-based AR

Wikitude Studio (AR Browser)



Sign up at <https://signup.wikitude.com>



Create your free account

If you already have an account, login [here](#).

First Name

Last Name

Email

Password

● One lowercase character

● One number

● 7 characters minimum

For further details regarding privacy, please visit our [Privacy Policy](#).

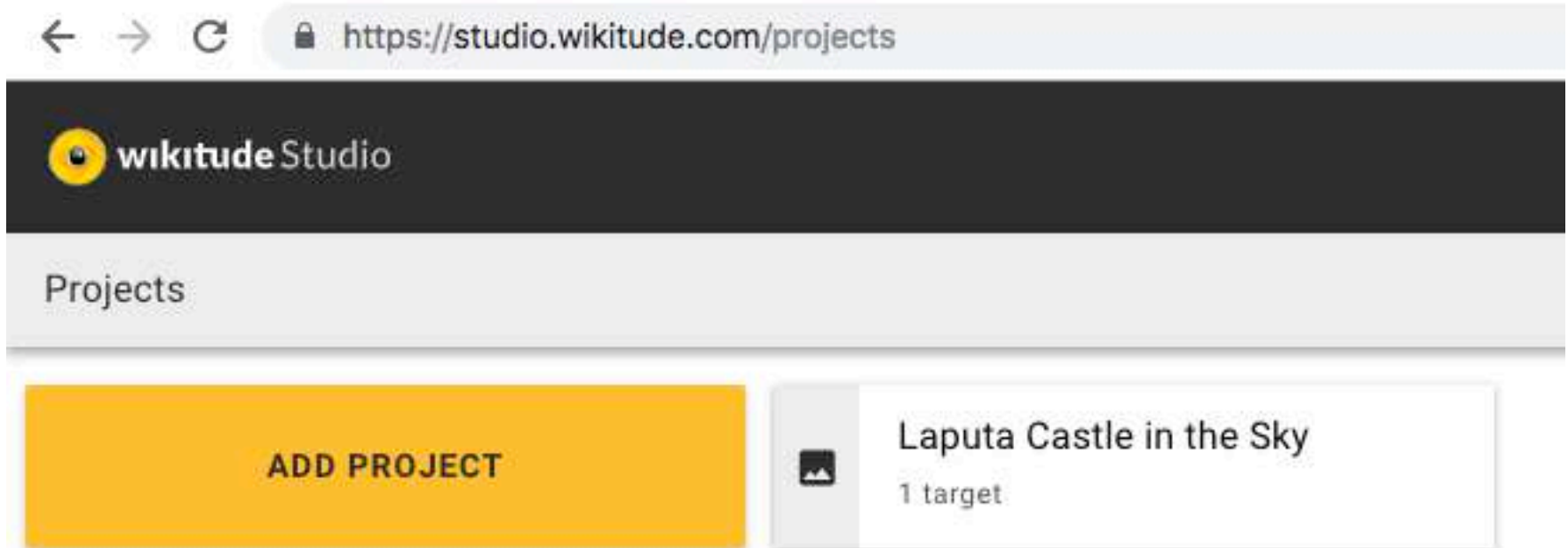
☐ Accept our [Terms of Service](#)

☐ Subscribe to our Newsletter

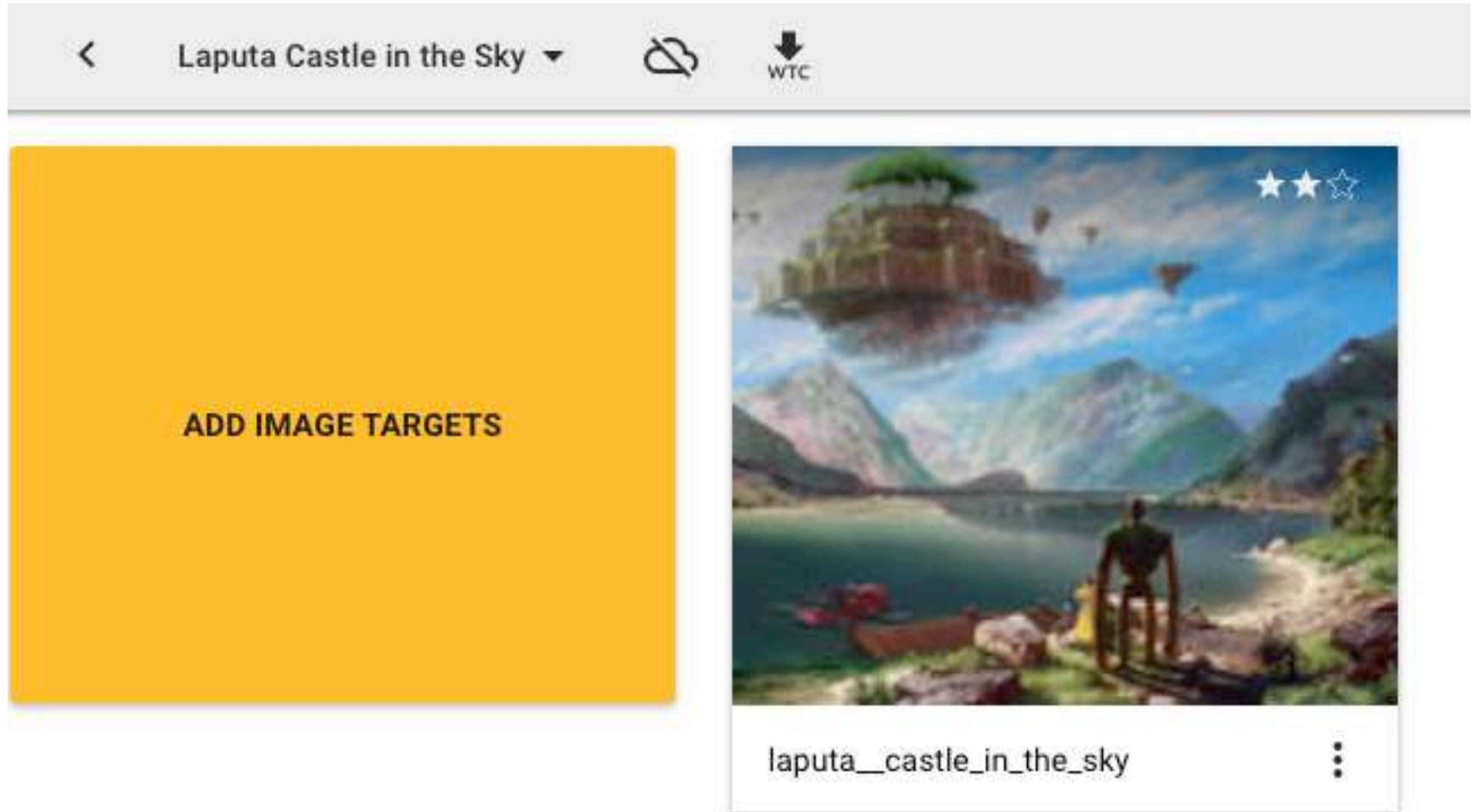
By subscribing to our newsletter, you agree to receive emails from us. You may opt-out by clicking the 'opt-out' option in every marketing communication you'll receive from Wikitude, or by sending an email to gdpr@wikitude.com.

CREATE YOUR FREE ACCOUNT

Go to Wikitude Studio and create a new project <https://signup.wikitude.com>



Add image targets



AR Marker generator: <http://www.brosvision.com/ar-marker-generator/>

Download a 3D model (.fbx)

Cartoon Mill On Island Low Poly 3d model

♥ 37



\$0.00

Download



Personal Use License



24,112
visits



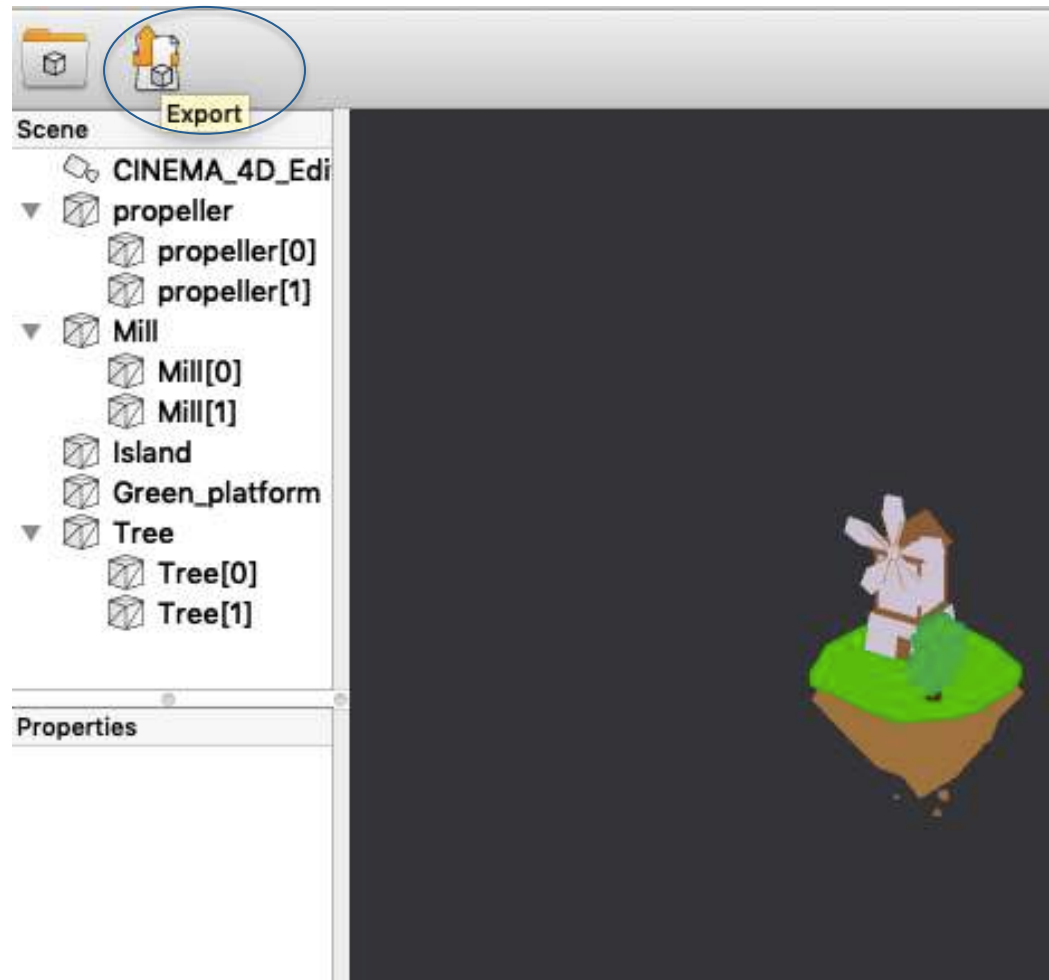
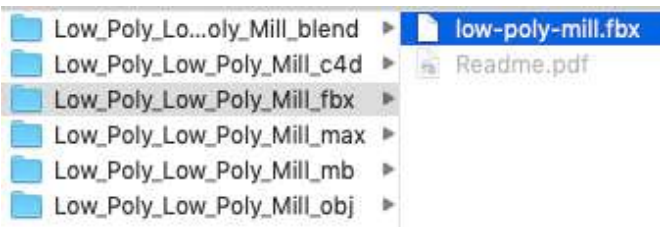
10,951
downloads



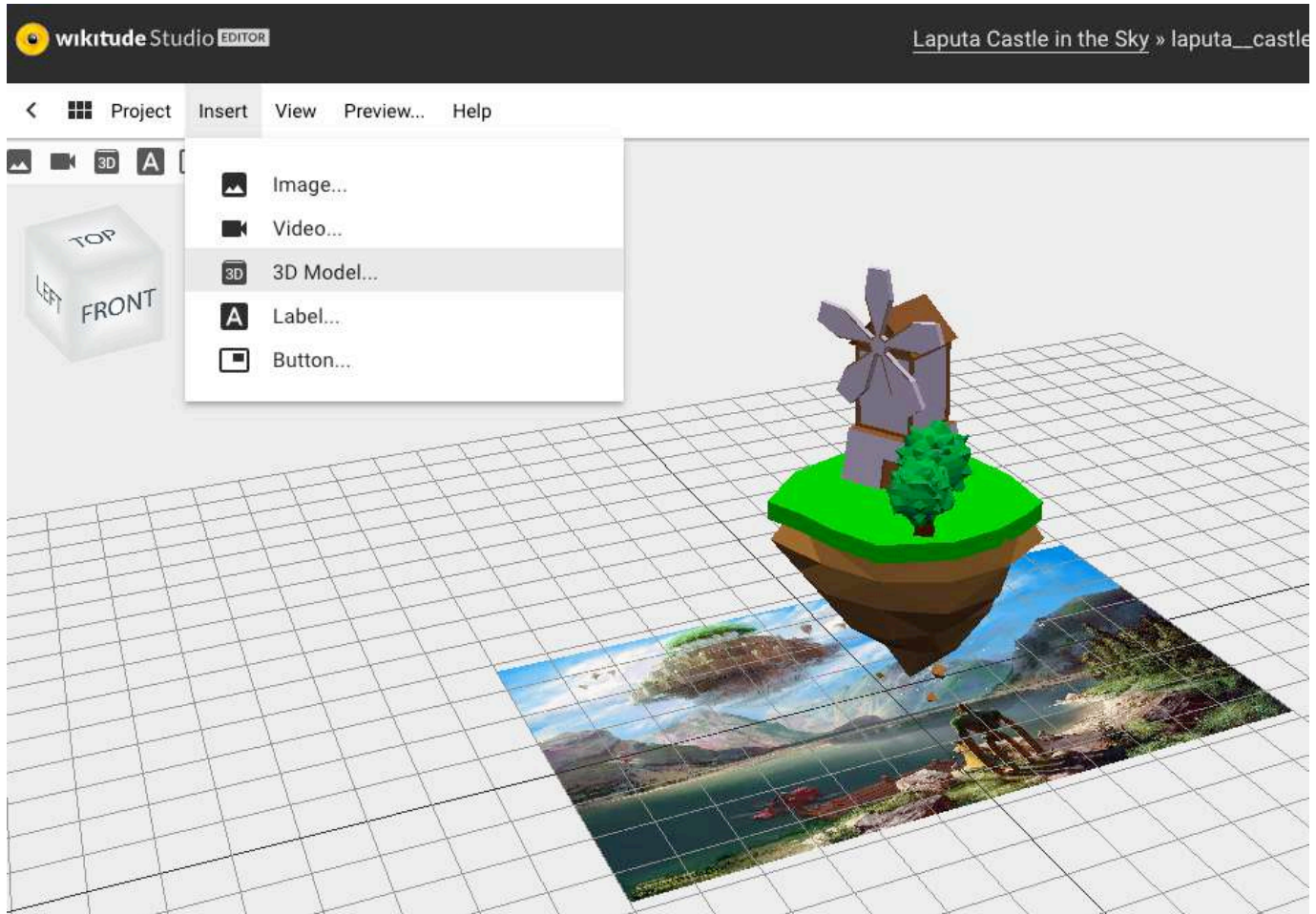
Submitted by
lowpolylab

<https://free3d.com/3d-models/fbx>

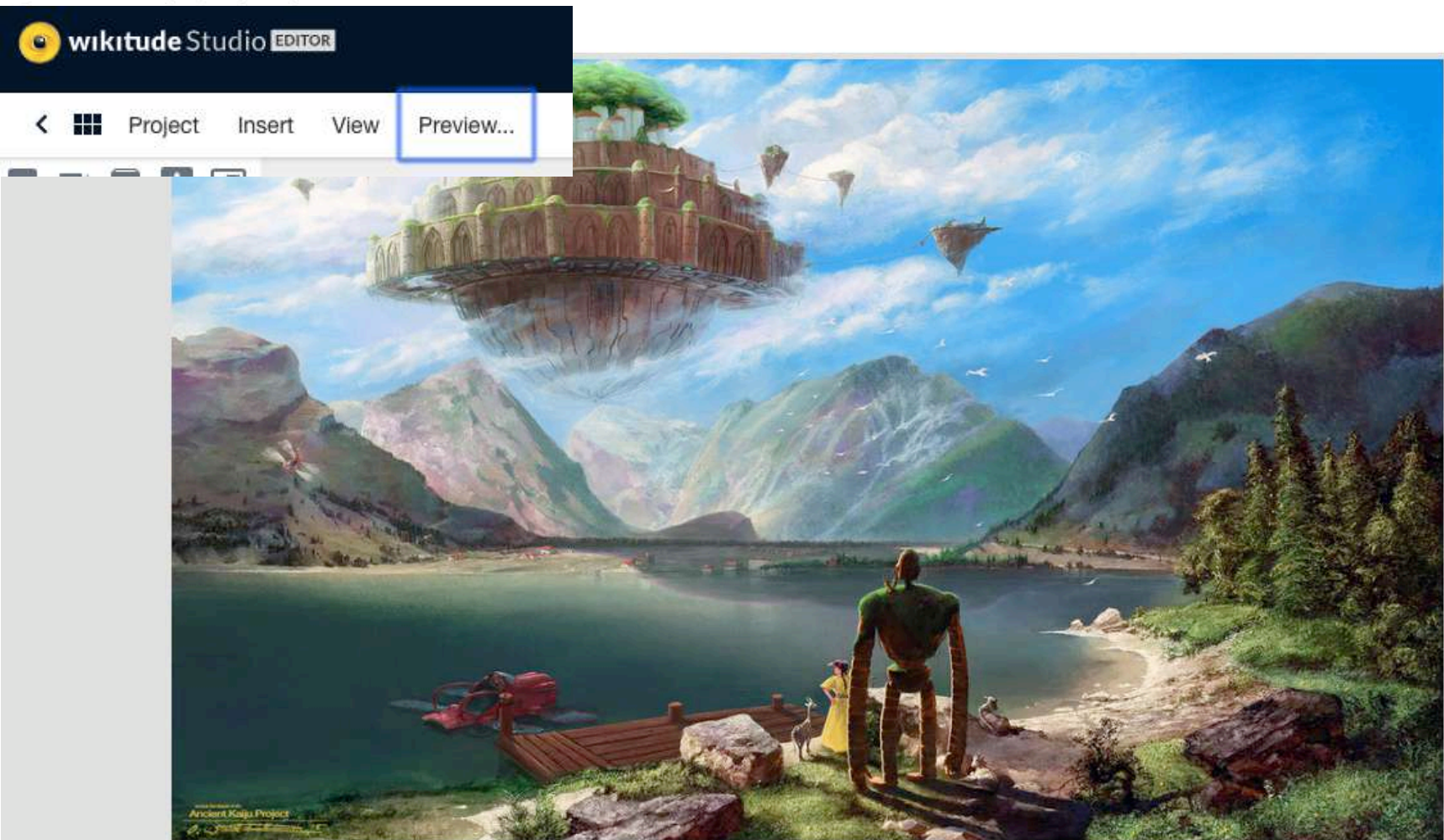
Format your model using Wikitude 3D Encoder



Insert your 3D model (.wt3)



Download Wikitude app and **preview** your project



Download the Wikitude App from [Google Play](#) or [Apple App Store](#)
Open the app, choose Developer from the menu and enter your Wikitude Studio username and password

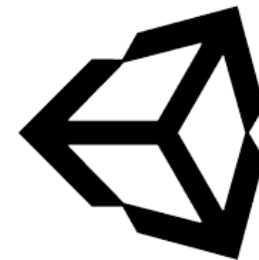
Or scan the QR Code with a QR code reader of your choice.
Open the scanned link with Wikitude and preview your project



Developing Augmented Reality



Native programming



vuforia™

Multiplatform

Part 2. Augmented Reality with **Vuforia**

- Easy and Intuitive

- Integration with Unity

- Compatibility with mid-range phones

- Good set of AR tools (not the best)

SDK Comparison

	Wikitude	EasyAR	Vuforia	ARToolKit	Kudan	MaxST	DeepAR	NyARToolKit
Maximum distance capturing / holding marker (m)	2.4 / 5	0.9 / 2.7	1.2 / 3.7	3 / 3	0.8 / 3	0.5 / 0.9	0.7 / 5	0.7 / 1
Recognition stability of immovable marker	6	7	10	8	10	7	8	5
Recognition stability of movable marker	6	3	6	6	6	2	7	3
Minimum angle recognition	10	35	30	10	30	50	35	45
Minimum visibility for recognition overlapped marker	100%	10%	20%	100%	25%	50%	10%	75%
2D Recognition	✓	✓	✓	✓	✓	✓	✓	✓
3D Recognition	✓	-	✓	-	✓	✓	-	-
Geo-Location	✓	-	-	-	-	-	-	-
Cloud Recognition	✓	-	✓	-	-	-	-	-
SLAM	✓	-	✓	-	✓	✓	-	-
Total (rating)	8.0	4.4	7.7	2.8	6.9	5.2	4.7	3.1

Augmented Reality SDKs



ARCore



It's party time

[Projects](#) [Learn](#)

[New](#) [Open](#) [My Account](#)

Project name

Dance Party

Template

3D

Location

/Users/Victor/Desktop

Add Asset Package

☐ OFF

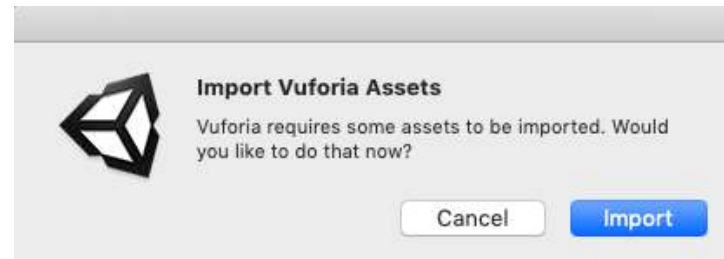
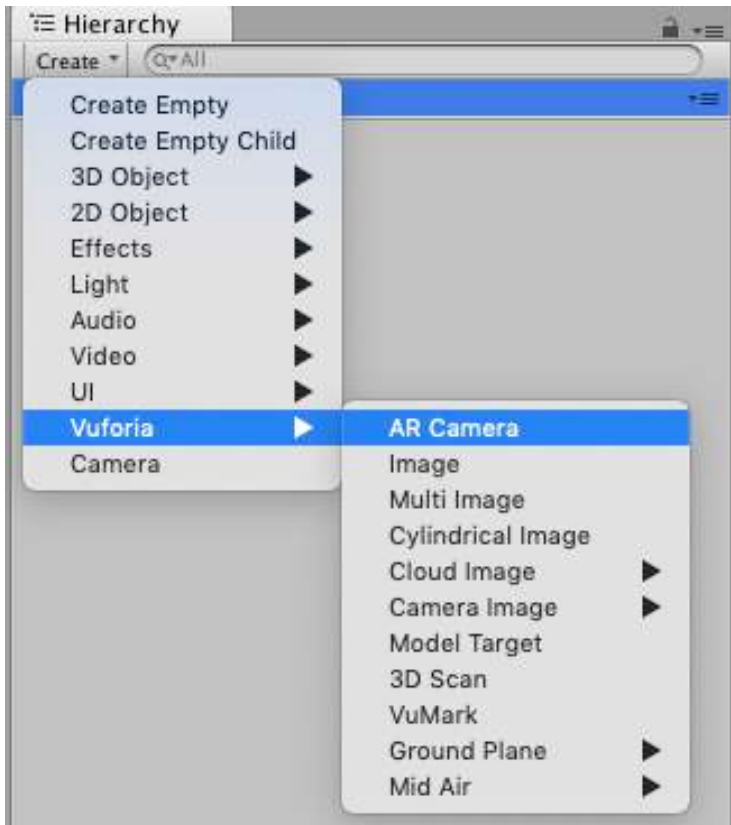
Enable Unity Analytics

Cancel

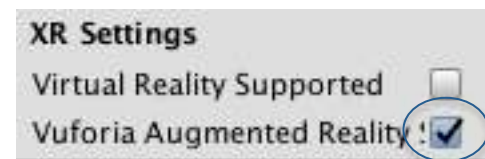
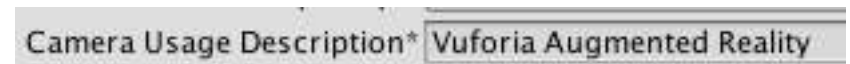
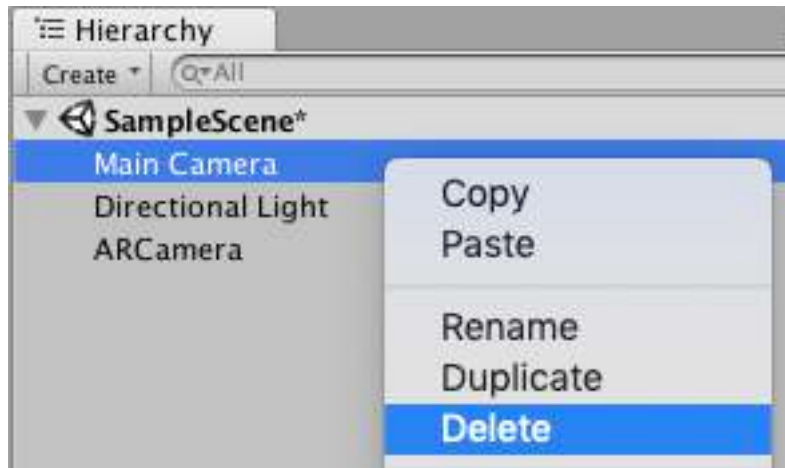
Create project

Exercise supported by Udemy's course: "Discover Augmented Reality Games – Unity/Vuforia"

Import Vuforia Assets

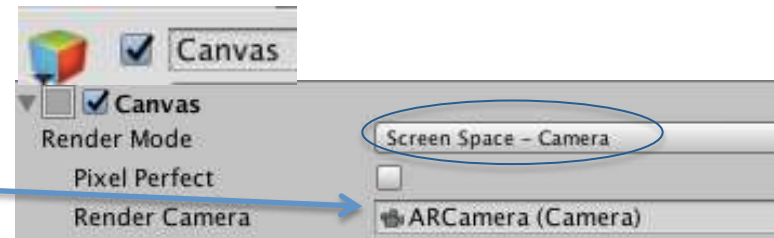
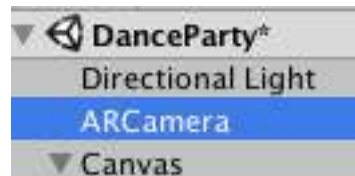
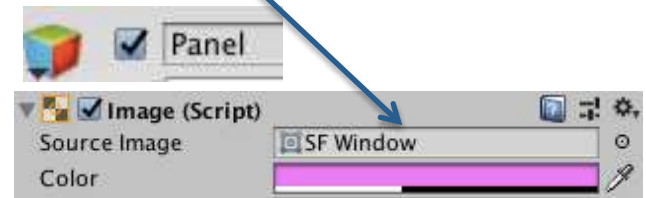
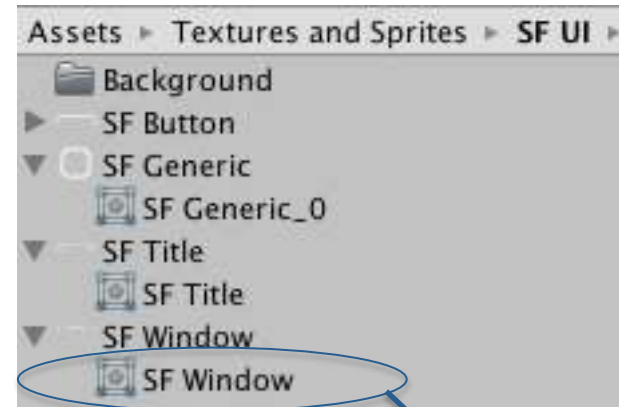
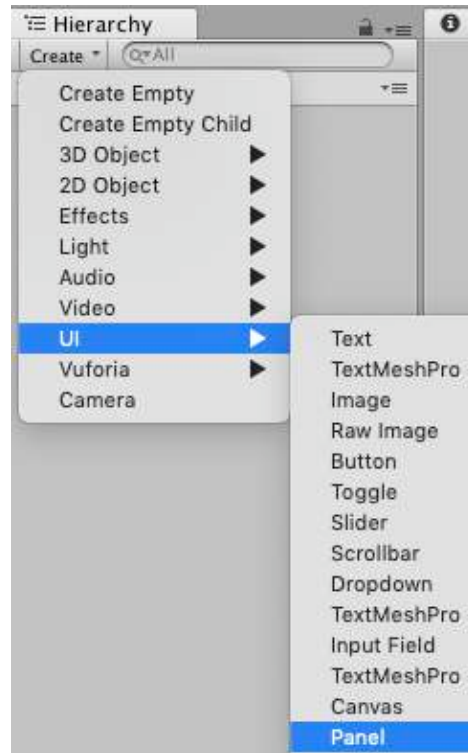


Remove Main Camera and prepare your build settings Android/iPhone

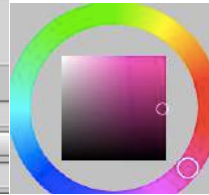
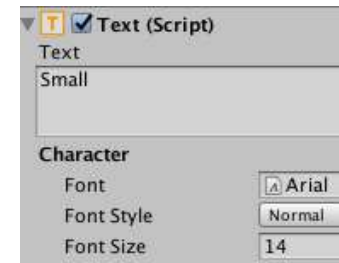
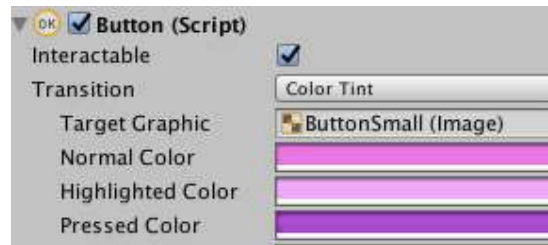
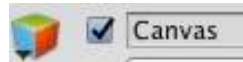
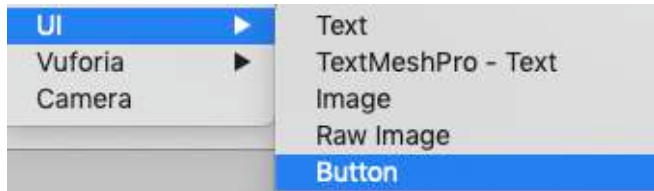


Vuforia AR

Dance Stage (window frame): download/import UI Unity Sample



UI (2+2) buttons

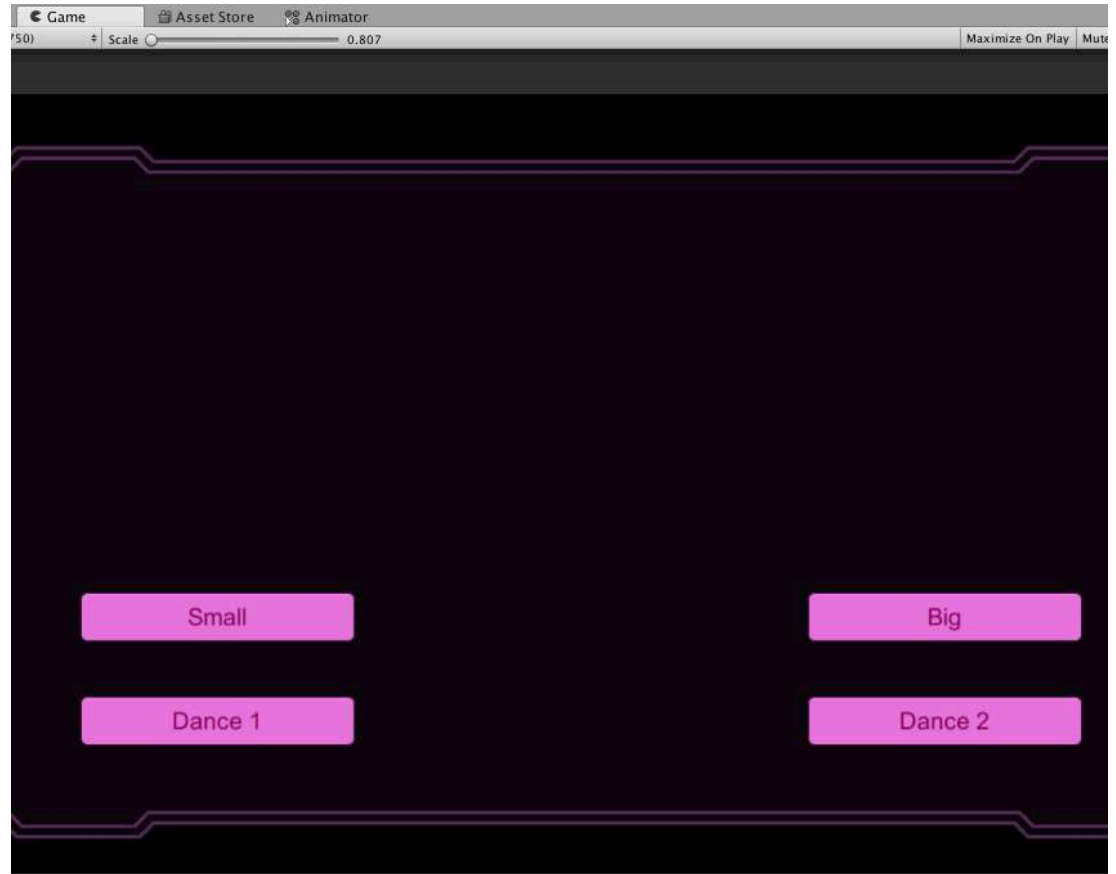
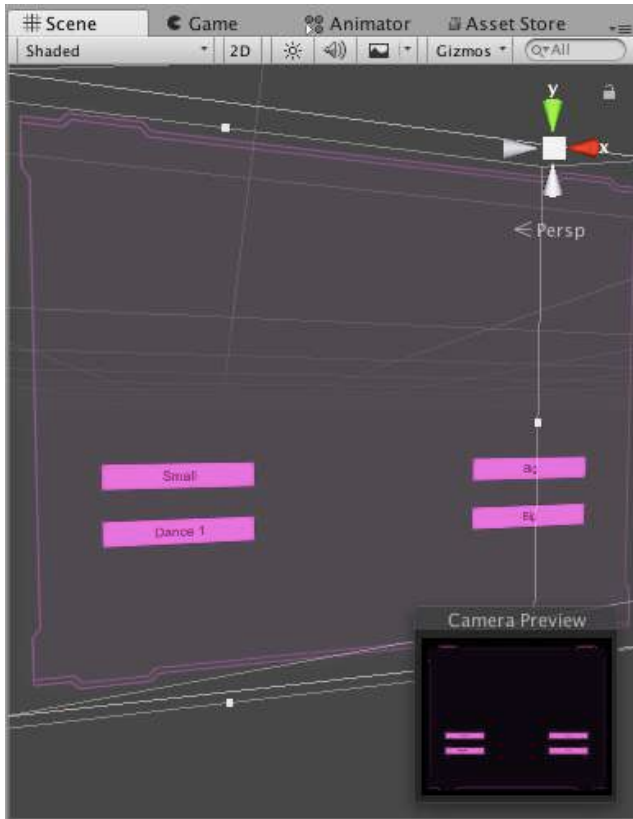


Canvas Render Mode: Overlay
if it doesn't work at first
change it to Screen Space - Camera
and back to Screen Space - Overlay

Adjust resolution (if needed)

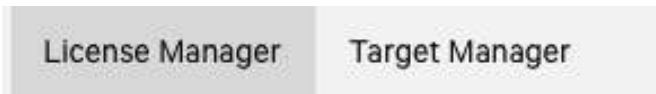
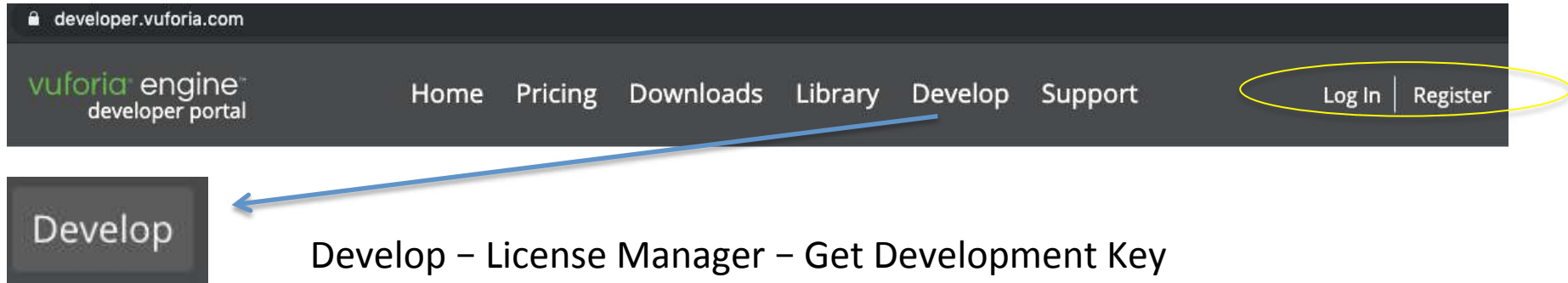


AR dance scene shows a window frame with 4 buttons



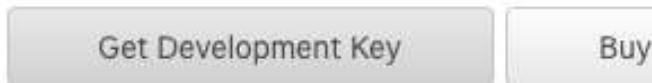
👁 Game resolution

Vuforia: License → <https://developer.vuforia.com>



License Manager

Create a license key for your application.



Name

Add a free Development License Key

App Name

RAAExample1 | You can

License Key

Develop

Price: No Charge

Reco Usage: 1,000 per month

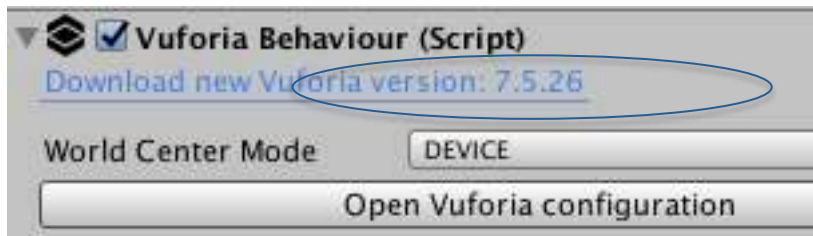
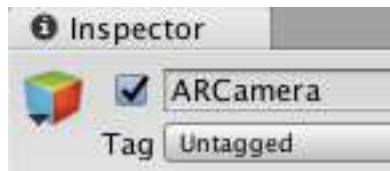
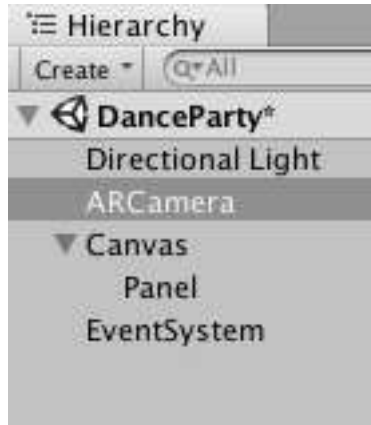
Cloud Targets: 1,000

VuMark Templates: 1 active

VuMarks: 100

☐ By checking this box, I acknowledge that this license key is subject to the terms and conditions of the [Vuforia Developer Agreement](#).

Vuforia: Add license to Unity project



RAA2018

[Edit Name](#)

[Delete License Key](#)

License Key

[Usage](#)

Please copy the license key below into your app

```
ARw5RRX/////AAABmf4x8KRI3EOKldd3FRT3RooqTlp  
eFlRc3j+UrYoFzQyXQDg+I3AibB1zI4WWIhX0clecvG  
1EbMzxZIt+AI/AFyrnCEMwefUJldlryfJXvUaWLXAcD  
5CVd2YMh5IX7cOEuCEogAYDrVpVbH++7BvAGCZDkqe8  
zLw9Emw/bmBtaJBmpHBPYya4Kmm4DfPEsiEUaoEiH2Y
```

Copy & Paste



App License Key

```
ARw5RRX/////AAABmf4x8KRI3EOKldd3F  
RT3RooqTlpfdnXeV9MheFlRc3j+UrYoFzQ  
vXODa+I3AibB1zI4WWIhX0clecvG10/e7U
```

Add License

Image Tracking (AR Marker) with Vuforia

License Manager

Target Manager

Add Database

Target Manager

Develop – Target Manager – Add Database

Create Database

Database Name *

RAAUniovi

Type:

- ☒ Device
☐ Cloud
☐ VuMark

Cancel

Create

Add Target

Type:



Single Image

File:

Matrix.jpg

.jpg or .png (max file 20 MB)

Width:

1

Matrix-1

Edit Name Remove

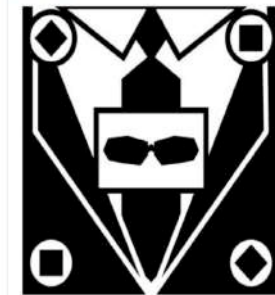


Image rating

Download Database (All)

Download Database

1 of 1 active targets will be downloaded

Name:
RAA2018Dev

Select a development platform:

- ☐ Android Studio, Xcode or Visual Studio
☒ Unity Editor

Cancel

Download

How image rating works

[Home](#)[Pricing](#)[Downloads](#)[Library](#)[Develop](#)[Support](#)

Target Image Rating

.jpg/.png max 2MB



Laputa

[Edit Name](#) [Remove](#)

Type: Single Image

Status: Active

Target ID: b23317e4c4914c2d8f1f33d4cd89c637

Augmentable: ★★★★★

Added: Nov 16, 2018 12:23

Modified: Nov 16, 2018 12:23



Add Image Target to Scene (download database and import on Unity)

Download Vuforia database

Compiling Database

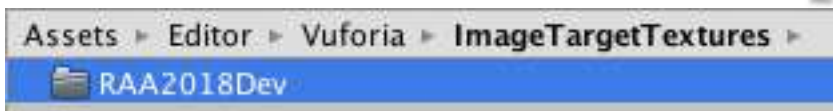
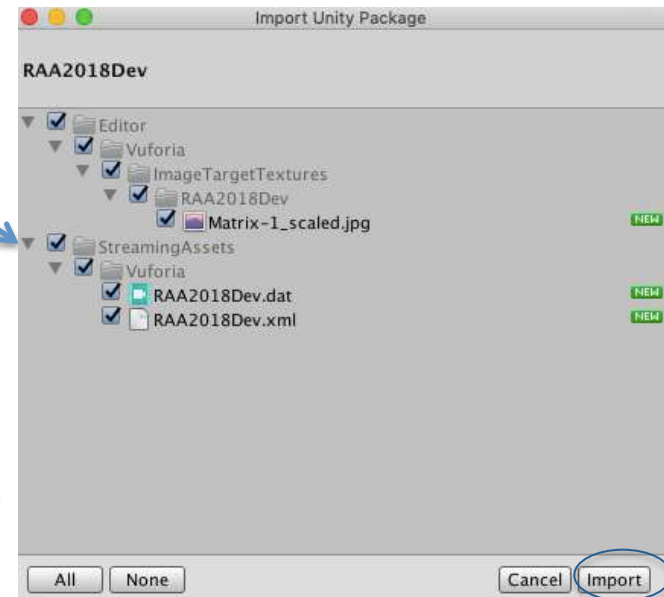
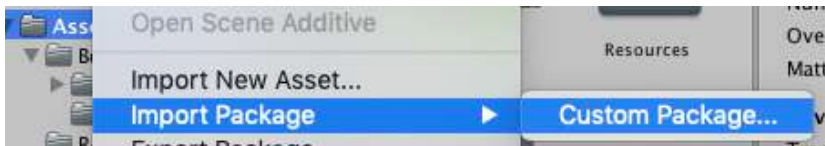


Compiling a database with Object targets may take several minutes

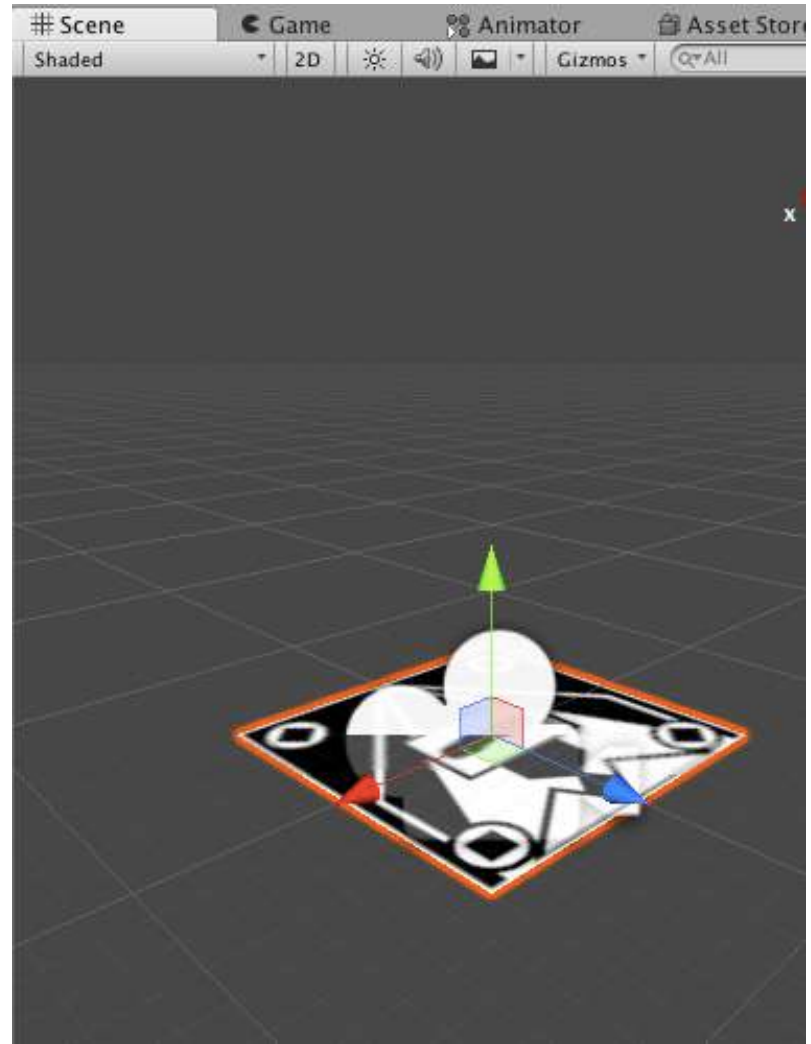
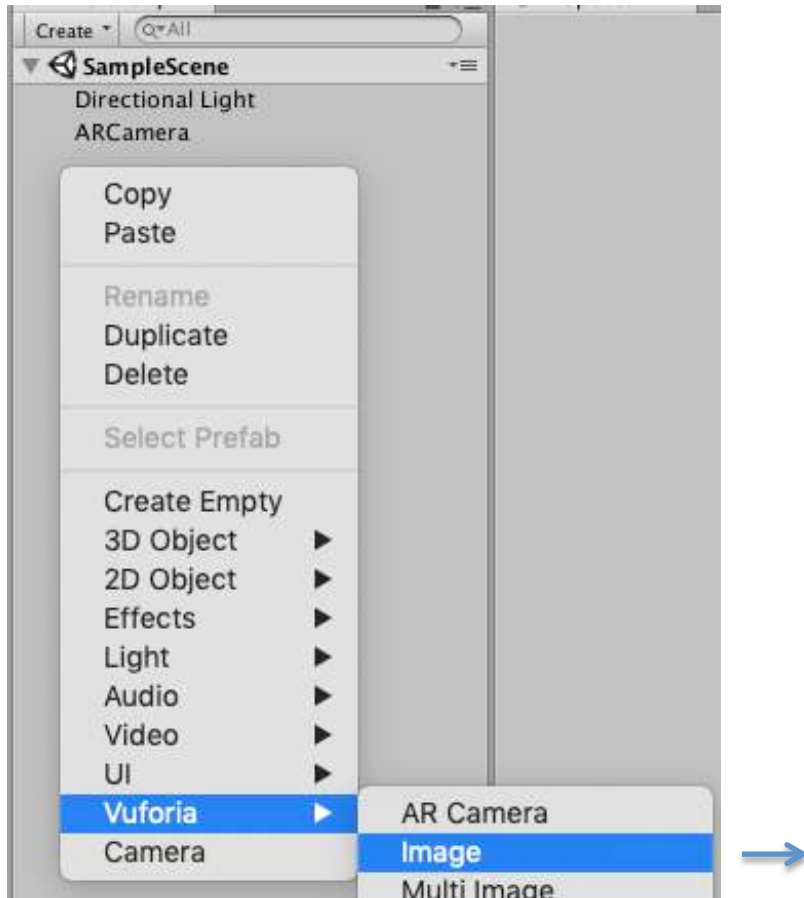
Import on Unity

Assets-> Import Custom Package or double click

Cancel



Add Image Target to Scene



🎩 Magic! Unity adds the image target automatically

Problem: Newer versions detect an Astronaut 🙄

This is why:

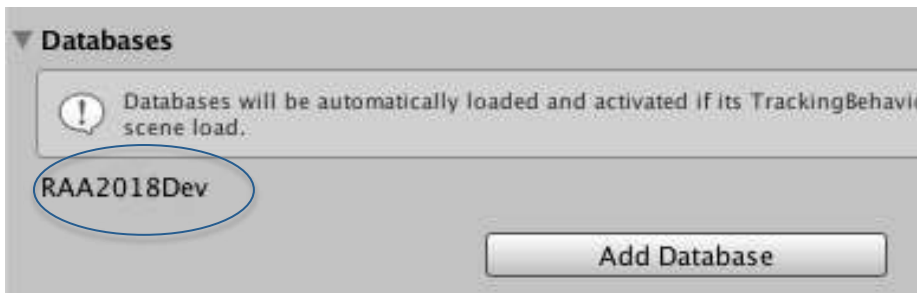
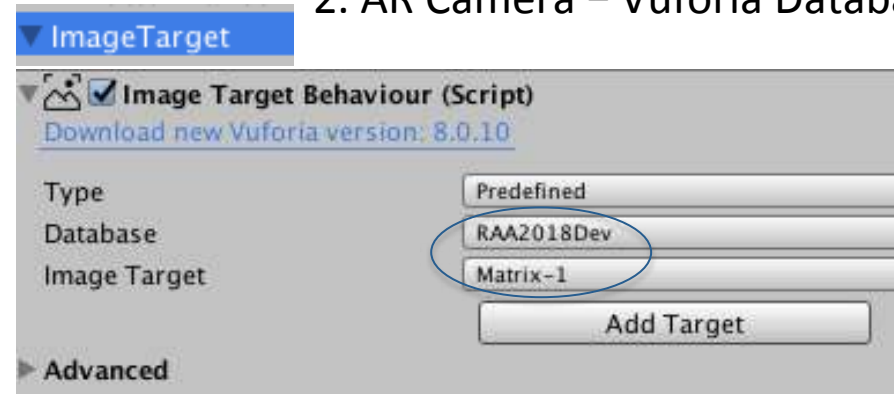
<https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity.html>



Solution

Change

1. Image Target Behaviour
2. AR Camera – Vuforia Databases



Our database needs to be loaded and active
The rest are examples we didn't ask for

Mixamo – Animated Character

The screenshot displays the Mixamo website interface. At the top, the 'mixamo' logo is followed by a navigation bar with 'Characters' (highlighted by a blue arrow and a yellow circle) and 'Animations'. Below the navigation bar is a search bar and a '96 Per page' dropdown. The main content area features a grid of character thumbnails. The characters shown are Erika Archer, Mortimer, Malcolm, Sporty Granny, Claire, and Maria J J Ong. The 'Sporty Granny' character is selected, and a larger preview of her in a blue tracksuit with a large pink bow in her hair is shown on the right. A blue arrow points to the 'DOWNLOAD' button below the preview. At the bottom, a download format dropdown menu is open, showing options: 'FBX(.fbx)' (checked), 'FBX for Unity(.fbx)', and 'Collada(.dae)'. A blue arrow points to the 'FBX for Unity(.fbx)' option. To the right of the format dropdown is a 'Pose' dropdown menu set to 'T-pose'. At the bottom right, there is another 'DOWNLOAD' button.

mixamo Characters Animations

Search 96 Per page

Erika Archer Mortimer Malcolm

Sporty Granny Claire Maria J J Ong

SPORTY GRANNY

DOWNLOAD

Format

- ✓ FBX(.fbx)
- FBX for Unity(.fbx)
- Collada(.dae)

Cancel

Pose

T-pose

DOWNLOAD

Mixamo – Animations (one-by-one download)

The screenshot displays the Mixamo website interface. On the left, a grid of animation thumbnails is shown, including 'Praying', 'Jumping', 'Shoved Reaction With Spin', and 'Samba Dancing'. The 'Samba Dancing' animation is selected, and its preview is shown in the center. To the right of the preview, a settings panel for 'Samba Dancing' is visible, featuring sliders for Energy (50), Posture (100), Overdrive (50), and Character Arm Space (50). Below these sliders, a 'Trim' section shows '547 total frames' and a 'Mirror' checkbox. A 'DOWNLOAD' button is located at the top right of the settings panel. Below the settings panel, a 'DOWNLOAD SETTINGS' dialog box is open. This dialog has four fields: 'Format' (set to 'FBX for Unity(.fbx)'), 'Skin' (set to 'Without Skin'), 'Frames per Second' (set to '30'), and 'Keyframe Reduction' (set to 'none'). A blue arrow points from the text 'No skin for animations' to the 'Without Skin' option in the 'Skin' dropdown. Another blue arrow points from the 'Format' dropdown to the 'FBX for Unity(.fbx)' option. The 'DOWNLOAD' button is at the bottom right of the dialog, and a 'CANCEL' button is at the bottom left.

DOWNLOAD SETTINGS

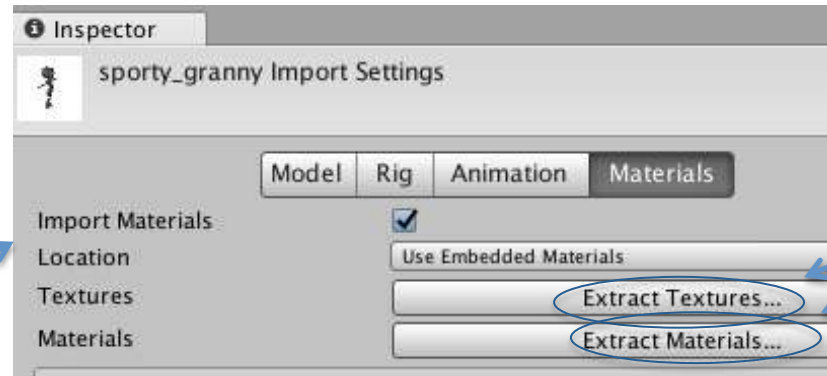
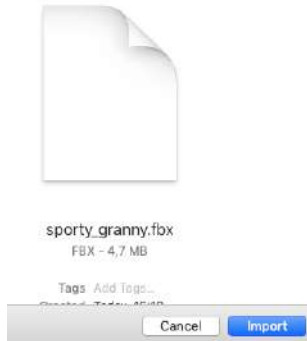
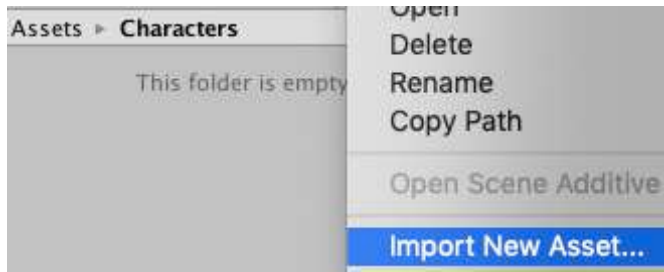
Format	Skin	Frames per Second	Keyframe Reduction
FBX for Unity(.fbx)	Without Skin	30	none

DOWNLOAD

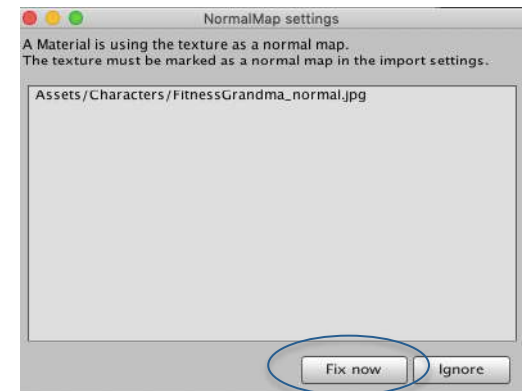
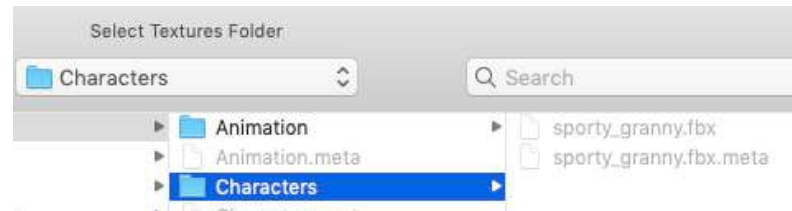
CANCEL

No skin for animations

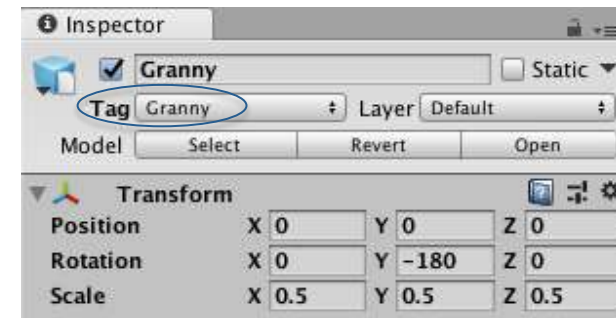
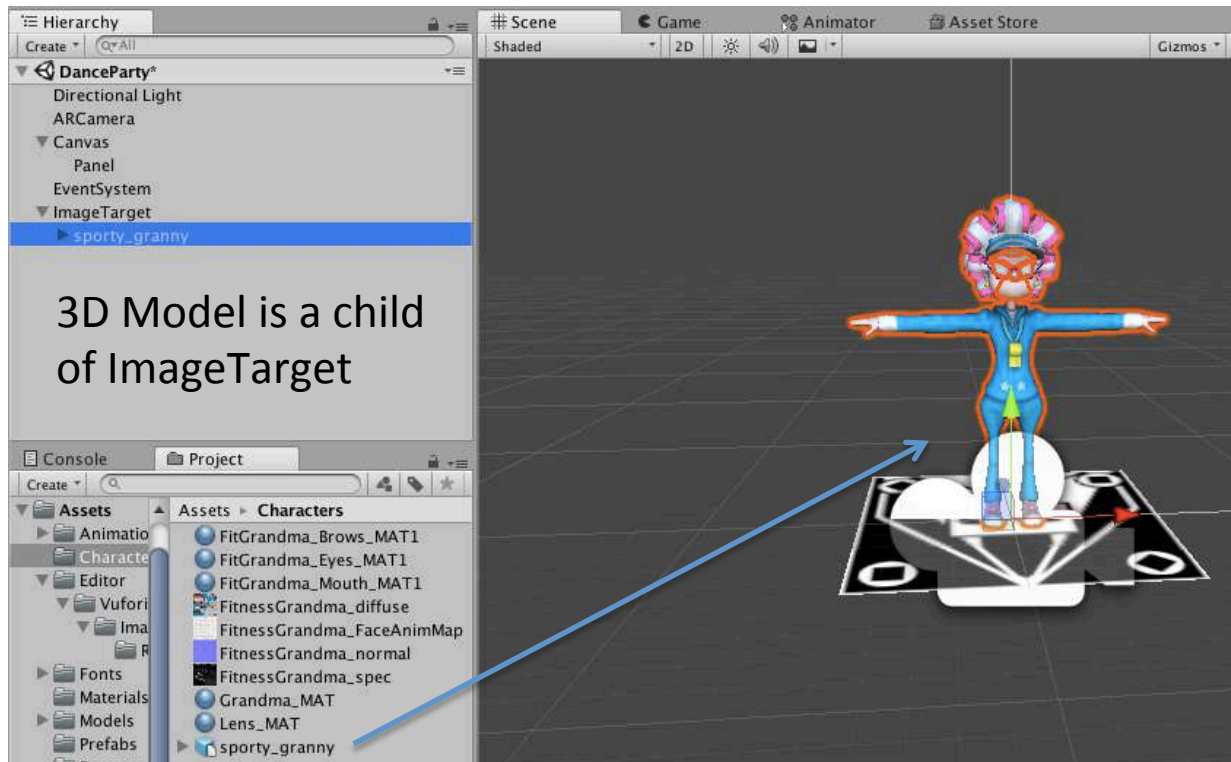
Import and configure character



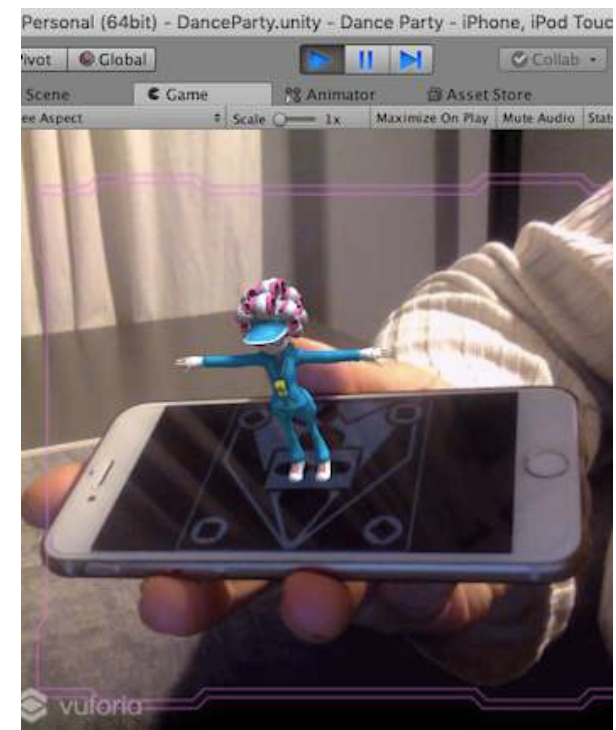
Fix
Textures +
Materials



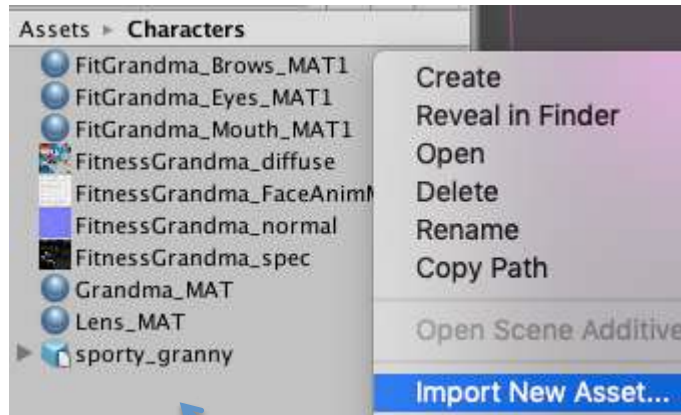
Place sporty granny on the AR marker



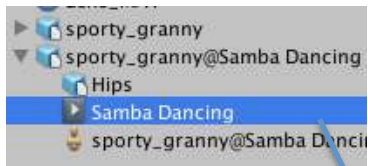
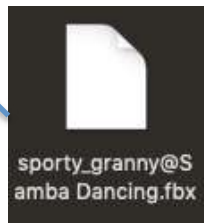
Add Tag & downsize



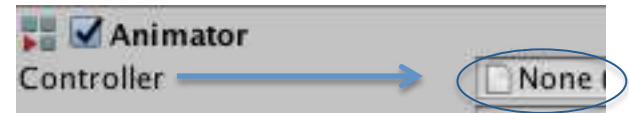
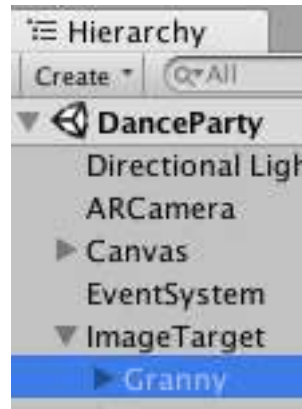
Animation -> add Animator Controller



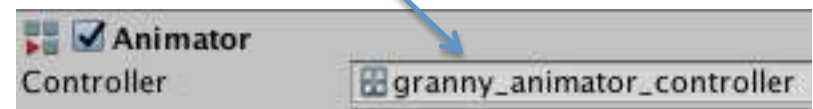
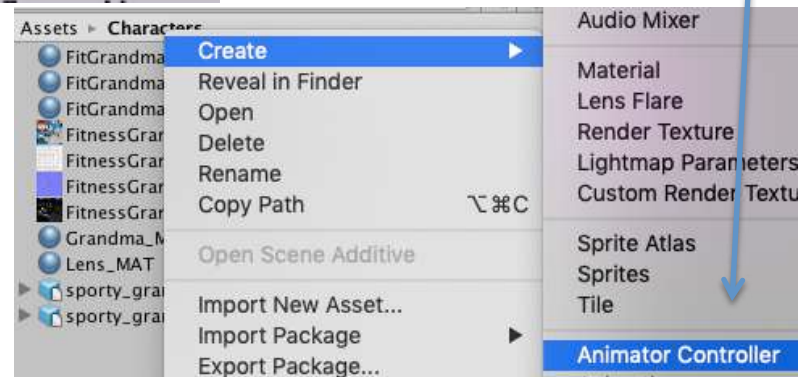
Drag & drop
also does the job



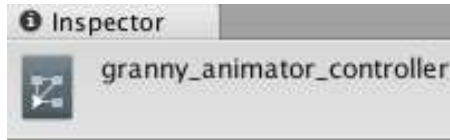
Preview animation
on inspector



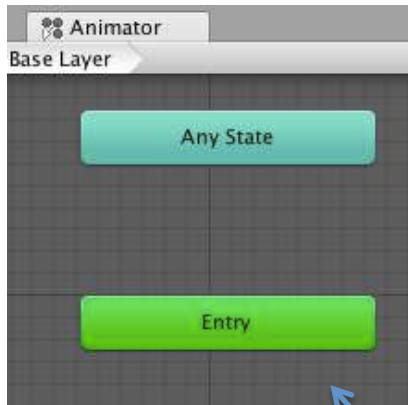
There is no animator controller



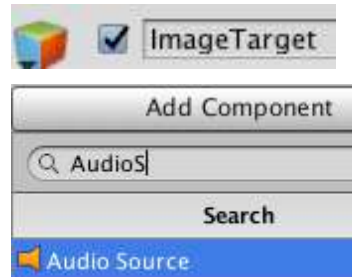
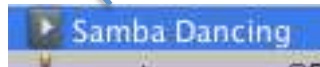
Granny dances to music



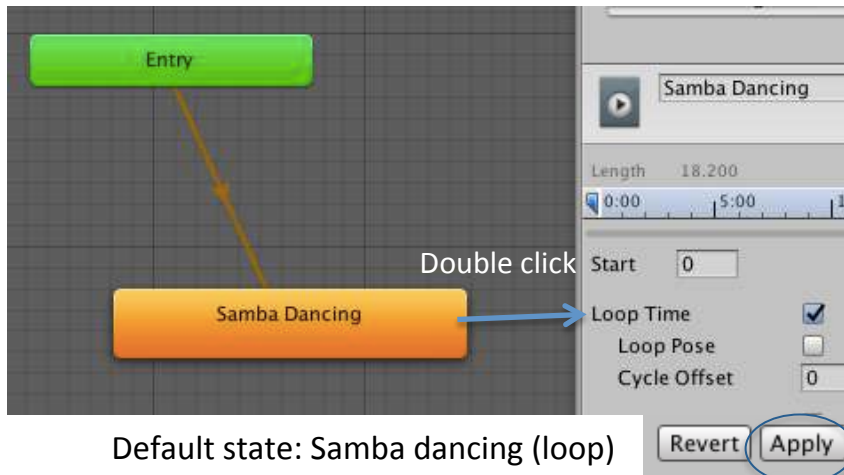
Initial states diagram with no transitions



Drag & drop



Audio is a component of ImageTarget



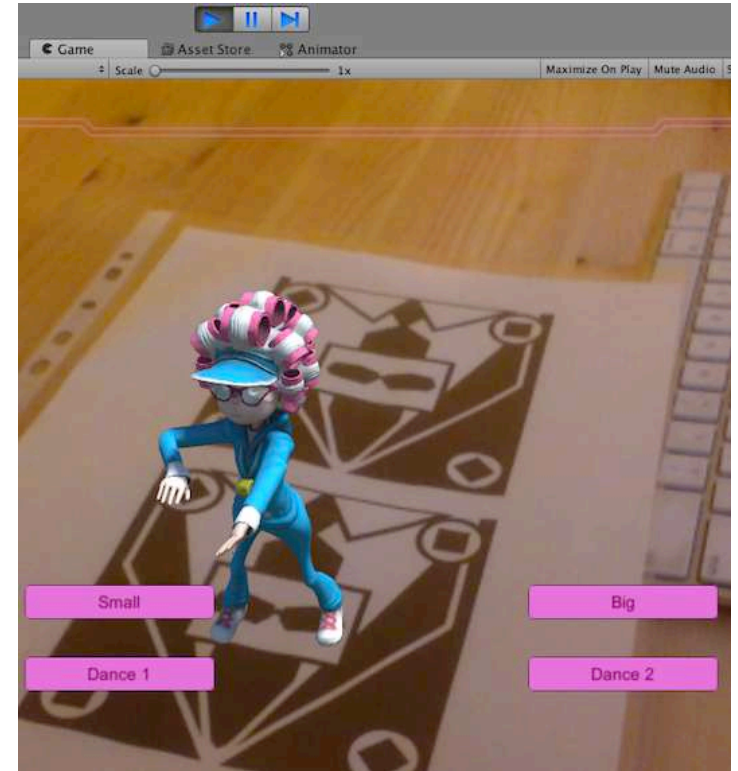
Default state: Samba dancing (loop)



Scripting: Play music (only) when tracker is detected



```
if (newStatus == TrackableBehaviour.Status.DETECTED ||
    newStatus == TrackableBehaviour.Status.TRACKED ||
    newStatus == TrackableBehaviour.Status.EXTENDED_TRACKED)
{
    Debug.Log("Trackable " + mTrackableBehaviour.TrackableName + " found");
    OnTrackingFound();
}
else if (previousStatus == TrackableBehaviour.Status.TRACKED &&
        newStatus == TrackableBehaviour.Status.NO_POSE)
{
    Debug.Log("Trackable " + mTrackableBehaviour.TrackableName + " lost");
    OnTrackingLost();
}
```



Coding:

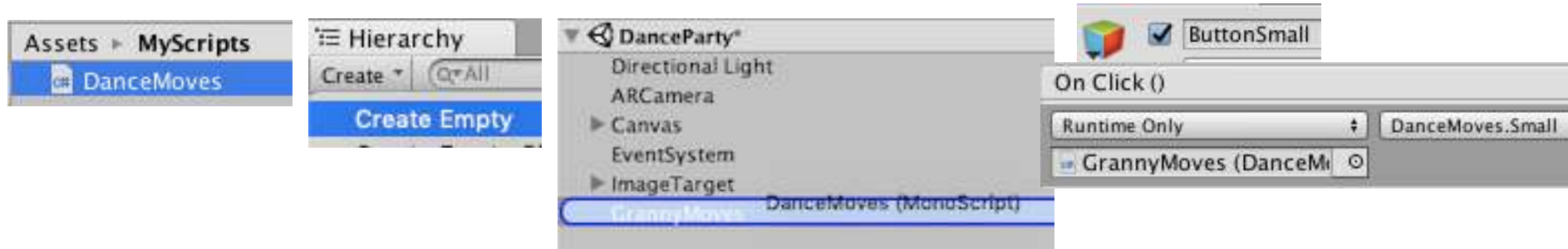
```
private AudioSource audioSource;

protected virtual void Start()
{
    audioSource = GetComponent<AudioSource>();
}
```

```
protected virtual void OnTrackingFound()
{
    //Play music
    audioSource.Play();
}

protected virtual void OnTrackingLost()
{
    //Pause music
    audioSource.Pause();
}
```

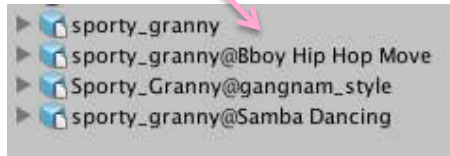

Scripting: Expand/Shrink Granny (upper buttons)



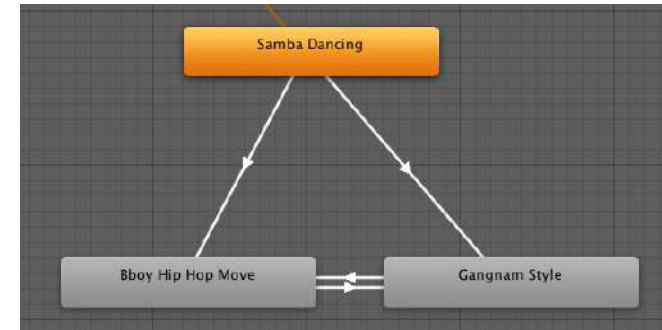
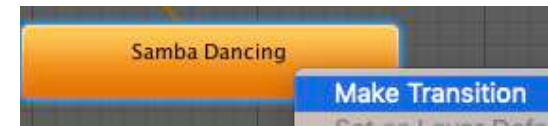
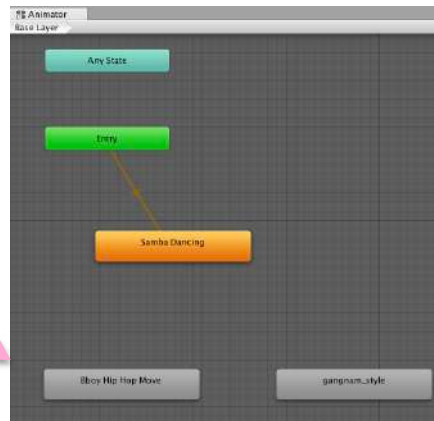
```
public class DanceMoves : MonoBehaviour {  
    public float scaleSpeed = 0.2f; ← 20% bigger/smaller  
    public void Big()  
    {  
        GameObject.FindWithTag("Granny").transform.localScale += new Vector3(scaleSpeed, scaleSpeed, scaleSpeed);  
    }  
    public void Small()  
    {  
        GameObject.FindWithTag("Granny").transform.localScale -= new Vector3(scaleSpeed, scaleSpeed, scaleSpeed);  
    }  
}
```

Scripting: Animation Transition

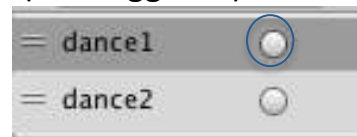
Add new moves



Select Granny > Animator Panel



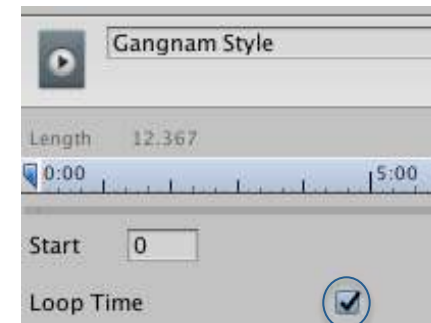
Add triggers: dance 1 & dance 2 (not triggered)



Choose transition > Select trigger



Doesn't wait to finish

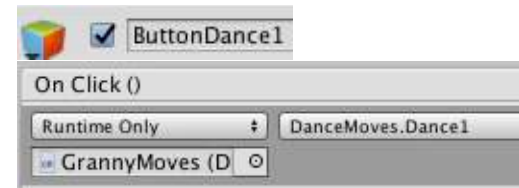


All dances with loop

When btn1 is triggered change to hip hop

Scripting: Animation Transition

```
public class DanceMoves : MonoBehaviour {  
  
    public float scaleSpeed = 0.2f;  
    public GameObject granny;  
    private Animator animator;  
  
    void Start()  
    {  
        animator = granny.GetComponent<Animator> ();  
    }  
  
    public void Big()  
    {  
        GameObject.FindWithTag("Granny").transform.localScale += new Vector3(scaleSpeed, scaleSpeed, scaleSpeed);  
    }  
  
    public void Small()  
    {  
        GameObject.FindWithTag("Granny").transform.localScale -= new Vector3(scaleSpeed, scaleSpeed, scaleSpeed);  
    }  
  
    public void Dance1()  
    {  
        animator.SetTrigger("dance1");  
    }  
  
    public void Dance2()  
    {  
        animator.SetTrigger("dance2");  
    }  
}
```



Build & Dance!

