VUFORIA

Corso Realtà Virtuale 2024/2025

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VUFORIA OVERVIEW

It is one of the most used SDK – software development Kit for Augmented Reality.

It exploits computer vision to recognize and track planar images and simple 3D objects, such as boxes, in real time, to enable developers to position and orient virtual objects, (as 3D models): Vuforia uses marker to analyze the real scene and to decide the position to instantiate virtual objects.

It supports Unity:

- https://developer.vuforia.com/downloads/sdk
- https://assetstore.unity.com/packages/templates/packs/vuforia-engine-163598

IMAGE TARGETS (2D)

Vuforia detects "feature points" in your target image for Marker Based AR.

It exploits a database of target images to be recognized and a Target Manager.

Then it uses the data obtained to compare the features in the target image from the database and the receiving frame from camera.

Vuforia is not open source, implementation details are unknown.

https://library.vuforia.com/objects/image-targets

UNITY AND VUFORIA ACCOUNT SETUP

UNITY PACKAGE AND SETUP

- You can download the SDK from
  - https://developer.vuforia.com/downloads/sdk
- You need a Vuforia Account to download the SKD and also to obtain a Base License.
- You can download here the Vuforia unitypackage for Unity
- You can then create an empty Unity Project and import the unitypackage.

- Vuforia Samples are available at:
  - https://assetstore.unity.com/packages/templates/packs/vuforia-core-samples-99026

UNITY PACKAGE AND SETUP

If you want to distribute a Vuforia application, you need to pay the Vuforia license which is quite expensive. For testing you don't need it, but you need one Basic License (Development Key).

To develop in Unity:

1. When logged in, the Basic License (Development Key) can be generated at: https://developer.vuforia.com/vui/develop/licenses
   Copy the Basic License Key.
2. When you are developing in your Unity Project with Vuforia, you can look at the Project section
3. Assets > Resources you can find the VuforiaConfiguration.asset , click on it.
4. And then in the Inspector you can paste the Basic License in the space on top of the "Add License" button .

(image explanation in the next slide)

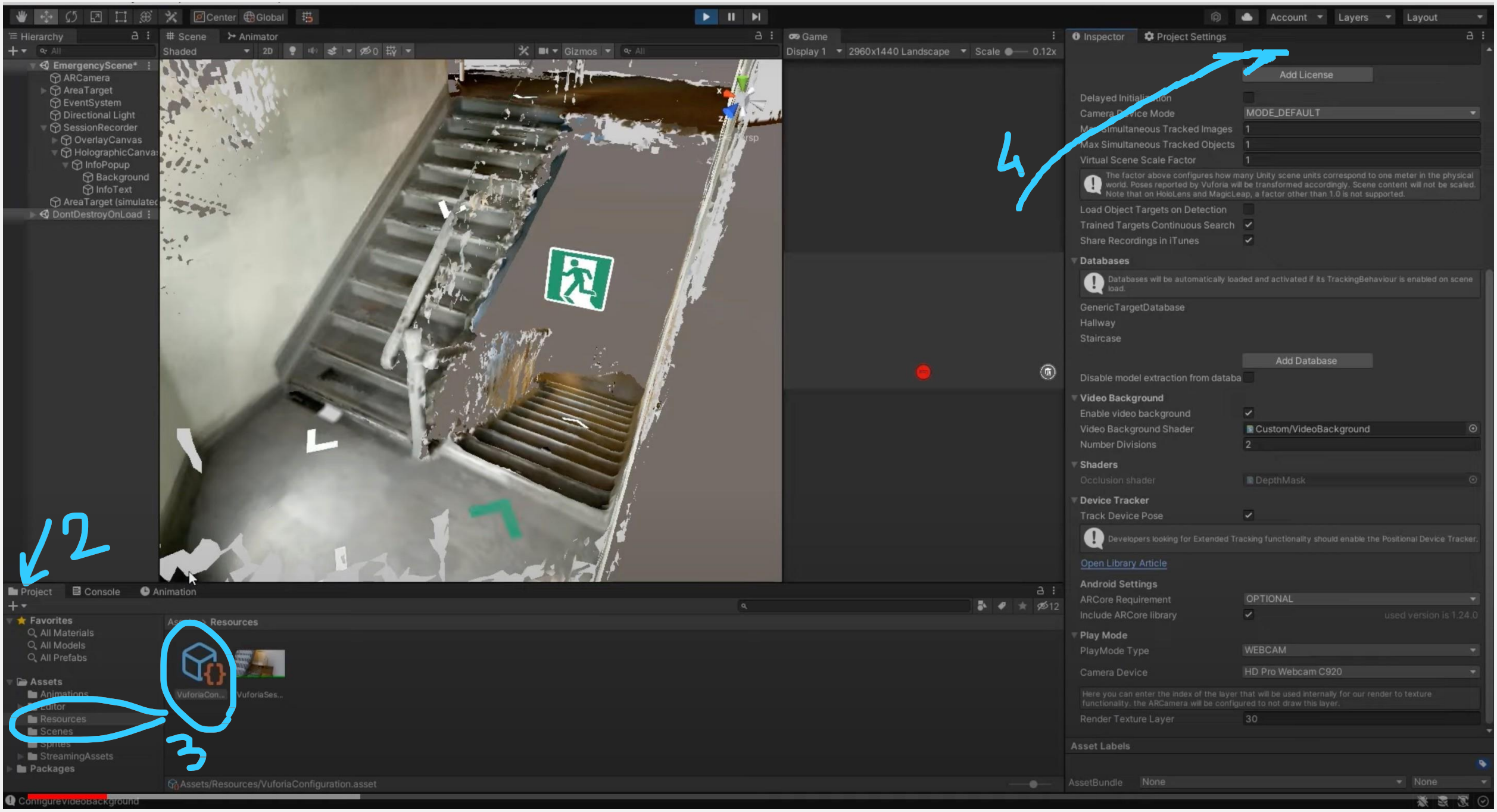

Hierarchy
EmergencyScene*
ARCamera
AreaTarget
EventSystem
Directional Light
SessionRecorder
OverlayCanvas
InfoPopup
Background
InfoText
DontDestroyOnLoad
Scene
Animator
Shaded
Gizmos
Game
Display 1
2960x1440 Landscape
Scale
0.12x
Inspector
Project Settings
Add License
Delayed Initialization
Camera Device Mode
MODE_DEFAULT
Max Simultaneous Tracked Images
Max Simultaneous Tracked Objects
Virtual Scene Scale Factor
The factor above configures how many Unity scene units correspond to one meter in the physical world. Poses reported by Vuforia will be transformed accordingly. Scene content will not be scaled. Note that on HoloLens and MagicLeap, a factor other than 1.0 is not supported.
Load Object Targets on Detection
Trained Targets Continuous Search
Share Recordings in iTunes
Databases
Databases will be automatically loaded and activated if its TrackingBehaviour is enabled on scene load.
GenericTargetDatabase
Hallway
Staircase
Add Database
Disable model extraction from databa
Video Background
Enable video background
Video Background Shader
Custom/VideoBackground
Number Divisions
Shaders
Occlusion shader
DepthMask
Device Tracker
Track Device Pose
Developers looking for Extended Tracking functionality should enable the Positional Device Tracker.
Open Library Article
Android Settings
ARCore Requirement
OPTIONAL
Include ARCore library
used version is 1.24.0
Play Mode
PlayMode Type
WEBCAM
Camera Device
HD Pro Webcam C920
Here you can enter the index of the layer that will be used internally for our render to texture functionality. the ARCamera will be configured to not draw this layer.
Render Texture Layer
30
Asset Labels
AssetBundle
None
None
Project
Console
Animation
Favorites
All Materials
All Models
All Prefabs
Assets
Animations
Editor
Resources
Scenes
Sprites
StreamingAssets
Packages
Resources
VuforiaCon...
VuforiaSes...
Assets/Resources/VuforiaConfiguration.asset
ConfigureVideoBackground
2
3
4

IMAGE TARGETS DATABASE

It is possible to create a new Image Target Database here (it is mandatory to be logged in the website):

https://developer.vuforia.com/vui/develop/databases

- Click on "Add Database" and then on Type: "Device"
- Select the DB
- Click on "Add Target" button
- Select the image, the width and a name: the image will be ranked from 0 (poor image) to 5 (very good target)

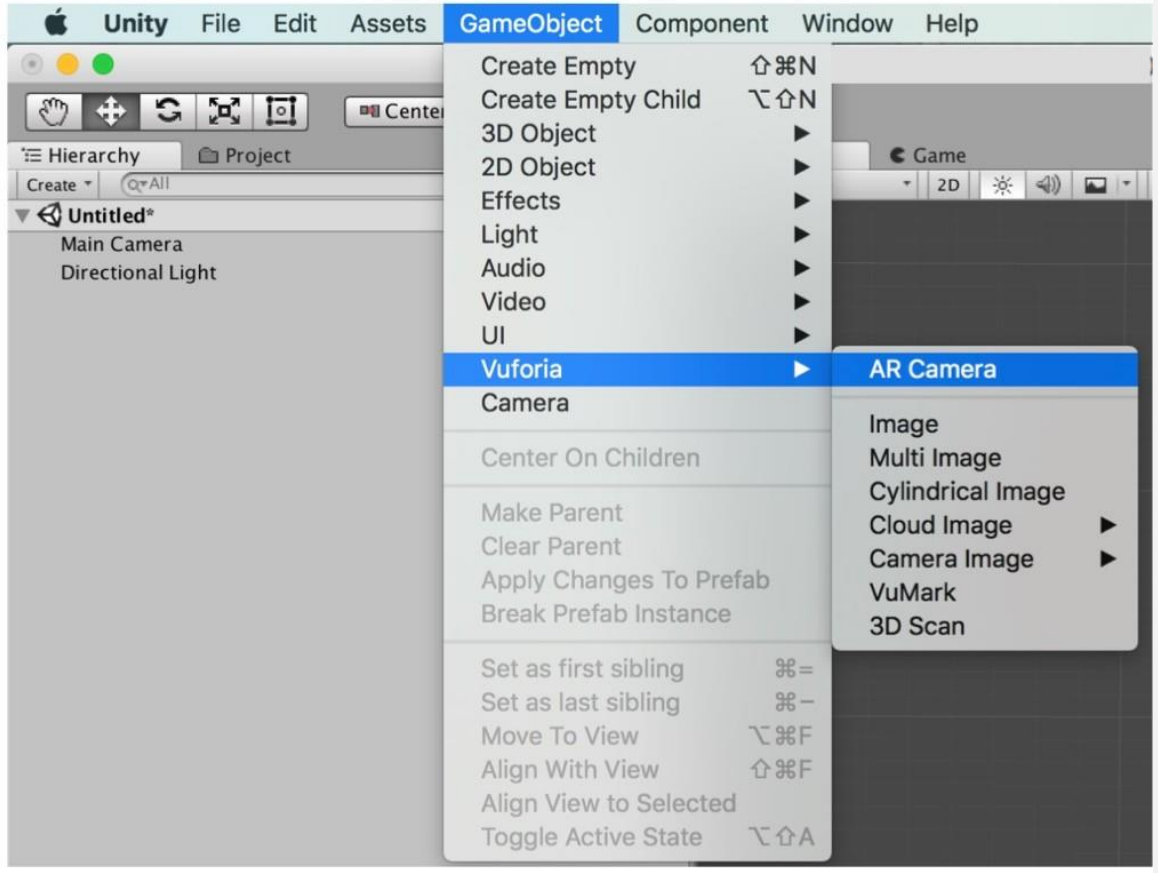
Then you can download the database as a UnityPackage and import it in your Unity Project

INSIDE THE UNITY PROJECT

https://library.vuforia.com/getting-started/getting-started-vuforia-engine-unity

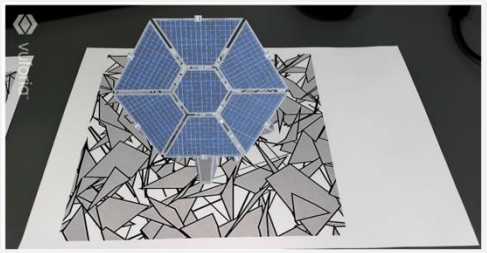
AR CAMERA

When using Vuforia, you need to add to the Scene a new type of camera: the AR Camera.



TARGET MANAGER IN UNITY

- Right click in the Scene:
  - Vuforia Engine -> Image Target
- Select the new object
- From the inspector, in the "Image Target Behavior" script:
  - Assign your database in the "Database" drop-down options.
    - Your database will have the same name you assigned in the Vuforia website (remeber to download it from vuforia website and import it as a UnityPackage)
  - Select your image target
- Add the virtual object to spawn when the target is visible, as child of the Image Target.
- The content will be automatically displayed, and it will move and rotate according to the real-world marker position and rotation.



https://library.vuforia.com/getting-started/vuforia-target-manager

BUILD SCENE OR PLAY IT

You can build the scene for iOS or Android.

You can also test it with the editor: you can test it with a physical camera (Webcam) connected to the Pc, then it is automatically detected and used for testing.
With unity editor play mode, complex features, like GroundPlane may not be available.

https://library.vuforia.com/unity-extension/vuforia-play-mode-unity