OpenCV for Unity 2.2.1

WebGL support**(Unity5.3 or later)**

iOS & **Android** support

Windows10 UWP support

Win & **Mac** & **Linux** Standalone support

Support for preview in the **Editor**

Work with Unity Free & Pro

System Requirements

Build Win Standalone & Preview Editor : Windows7 or later

Build Mac Standalone & Preview Editor : OSX 10.8 or later

OpenCV for Unity is an Assets Plugin for using **OpenCV** from within **Unity**.

- Since this package is **a clone of OpenCV Java**, you are able to use the same API as OpenCV Java 3.3.0(git: opencv,opencv-contrib).
- You can image processing in **real-time** by using the **WebCamTexture** capabilities of Unity. **(real-time face detection works smoothly in iPhone 5)**
- Provides a method to interconversion of **Unity's Texture2D** and **OpenCV's Mat**.
- **IDisposable** is implemented in many classes.You can manage the resources with the "**using**" statement.
- PlayMakerActions for OpenCVforUnity is available.

Official Site | ExampleCode | Android Demo WebGL Demo | Tutorial & Demo Video | Forum | API Reference

Please refer to OpenCV official document for the details of the argument of the method.

Example code using OpenCV for Unity is available.

- MarkerBased AR Example
- MarkerLess AR Example
- FaceTracker Example
- FaceSwapper Example
- FaceMask Example
- RealTime FaceRecognition Example
- Voforia with OpenCV for Unity Example
- Kinect with OpenCV for Unity Example
- GoogleVR with OpenCV for Unity Example
- AVPro with OpenCV for Unity Example
- HoloLens with OpenCV for Unity Example

Version changes

2.2.1 [Common]Updated to OpenCV3.3.0. [Common]Added dnn module.(win,mac,ios,android platform) [Common]Added img_hash, reg, text module.(all platform) [Common]Added MobileNetSSDExample, MobileNetSSDWebCamTextureExample, TensorFlowWebCamTextureExample, ThinPlateSplineShapeTransformerExample, TextDetectionExample, VideoWriterExample. [Common]WindowsStoreApp8.1 & WindowsPhone8.1 support have been deprecated.

2.2.0 [Common]Updated WebCamTextureToMatHelper.cs v1.0.2 [Common]Improved Utils.getFilePathAsync().

2.1.9 [WebGL]Fixed Utils.getFilePathAsync() method.

2.1.8 [Common]Added PCAExample. [Common]Updated WebCamTextureToMatHelper.cs and OptimizationWebCamTextureToMatHelper.cs(Changed several method names.).

2.1.7 [Common]Improved Utils.getFilePath() and Utils.getFilePathAsync(). [Common]Improved WebCamTextureAsyncDetectFaceExample.cs. [Common] Fixed the const value of Calib3d class.

2.1.6 [Common]Fixed fastMatToTexture2D() method.

2.1.5 [Common]Updated to OpenCV3.2.0. [Common]Added fuzzy, phase_unwrapping, saliency, shape, tracking module. [Common]Added TrackingSample. [iOS]Added ios_exclude_contrib.zip for build size reduction. [Android]Added

android_exclude_contrib.zip for build size reduction.

2.1.4 [Common]Changed the scene name.("Sample" to "Example") [Common]Fixed ArUcoTexture2DExample and ArUcoWebCamTextureExample. [Common]Added ConnectedComponentsExample. [Common]Added GreenScreenExample.

2.1.3 [UWP]Added OpenCVForUnityUWP_Beta3.zip.

2.1.2 [Common]Fixed WebCamTextureToMatHelper.cs.(flipVertical and flipHorizontal flag)

2.1.1 [Common]Fixed OpenCVForUnityMenuItem.cs.(No valid name for platform: 11 Error) [Common]Added Utils.textureToTexture2D() method. [Common]Added Mat class operators. [Common]Added PolygonFilterSample.

2.1.0 [Common]Fixed WebCamTextureToMatHelper class. [Common]Added Utils.getVersion(). [Common]Fixed Utils.getFilePathAsync().

2.0.9 [WebGL]Added WebGL(beta) support.(Unity5.3 or later)

2.0.8 [Common]Improved WebCamTextureHelper class. [Common]Fixed ArUcoSample.

2.0.7 [Common]Added aruco, structured_light, xfeatures2d module. [Common]Added ArUcoSample, GrabCutSample, InpaintSample, MatchShapesSample, MSERSample.

2.0.6 [WSA]Fixed an issue where Windows App Certification Kit fails.

2.0.5 [Common]Added HOGDescriptorSample.

2.0.4 [Android]Added Support for Split Application Binary (.OBB) [Android]Removed opencvforunity.jar.

2.0.3 [Common]Added SVMSample. [Common]Fixed VideoCaptureSample and WebCamTextureAsyncDetectFaceSample. [UWP]Added OpenCVForUnityUWP_Beta2.zip.

2.0.2 [Common]Fixed CS0618 warnings: `UnityEngine.Application.LoadLevel(string)' is obsolete: `Use SceneManager.LoadScene'.

2.0.1 [OSX]Fixed SIGILL Exception. [Common]Added Utils.setDebugMode() method. [Common]Added MatchTemplateSample, StereoBMSample, SeamlessCloneSample and WebCamTextureDetectCirclesSample. [Common]Added flipVertical flag, flapHorizontal flag and GetWebCamDevice() method to WebCamTextureToMatHelper.cs.

2.0.0 [Common]Updated to OpenCV3.1.0. [Common]Included Old Version based on “OpenCV2.4.11”. [Common] Included Beta Version of Windows10 UWP Support.(This is beta version based on OpenCV3.0.0. opencv_contrib modules is not supported.)

Beta16 [iOS]Fixed libopencvforunity.a Bitcode Setting.

Beta15 [Common]Fixed WebCamTextureToMatHelper.cs.(Add didUpdateThisFrame () method)

Beta14 [Common]Fixed WebCamTextureToMatHelper.cs.(Bug of rotation convertion from WebCamTexture to Mat in Win,Mac StandAlone Build)

Beta13 [Common]Added fastTexture2DToMat() and fastMatToTexture2D(). [Common] Renewed the samples using WebCamTextureToMatHelper.(Supports all screen orientation.)

Beta12 [iOS]Fixed malloc_error that occurs in Unity5.3.1p2.

Beta11 [iOS]Enabled Jpeg format.(Added mjpeg format support in VideoCapture class)

Beta10 [iOS]Enabled Bitcode.

Beta9 [UWP]Added support for Windows10 UWP.(This is a test version. opencv_contrib modules is not supported.)

Beta8 [Common]Fix FaceRecognizerSample. [Common] Delete the method using Default parameter specifiers. [Android] Compile the library using “armabi-v7a with NEON” option.

Beta7 [Common]Add WrapPerspectiveSample, HandPoseEstimationSample.

Beta6 [iOS]Fix WebCamTexture bug of SampleScene in Unity5.2.

Beta5 [Linux]Add Linux Support. [WindowsStoreApp8.1]Support for methods using Low-level Native Plugin Interface. [Common]Rewrite SampleScene.

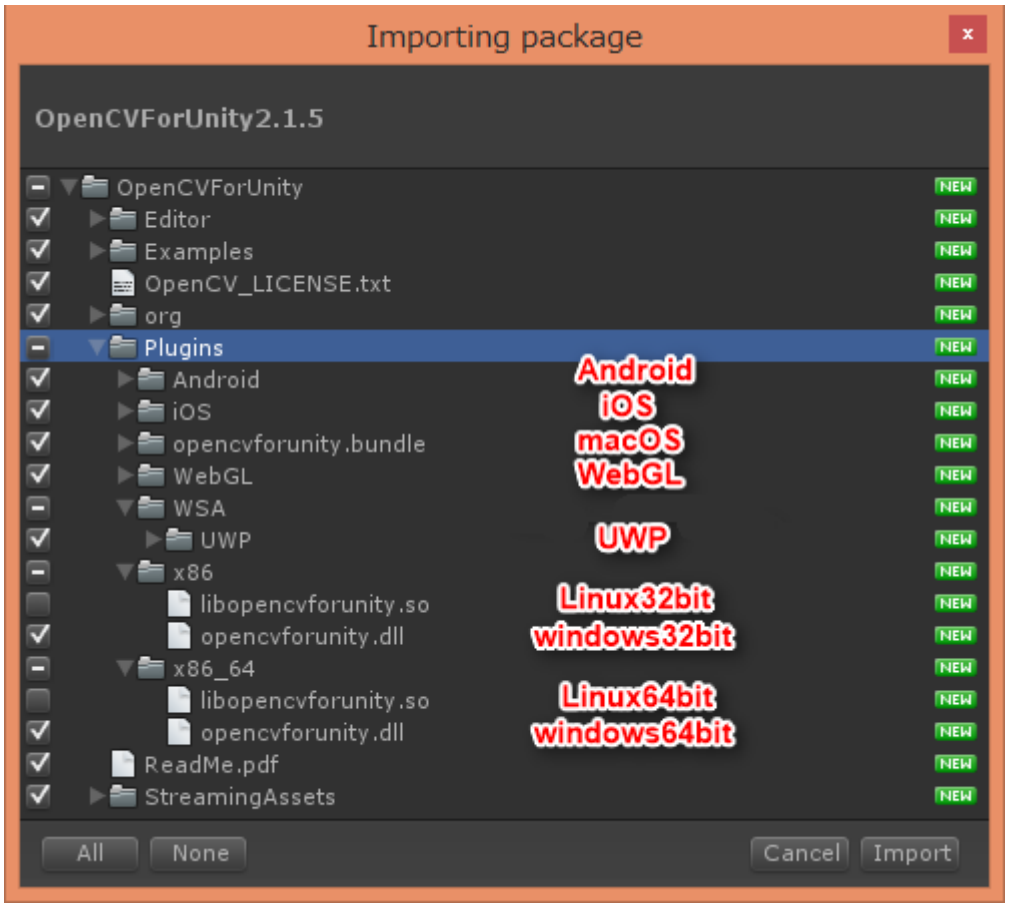
Beta4 [Common]Add Utils. getGraphicsDeviceType(). [Common]Add SampleScene Setup Tutorial Video for Unity5.

Beta3 [Common]Add CamShiftSample.(Object Tracking) [Common]Add OpenCVForUnityMenuItem.cs.(This script set plugin import settings automatically from MenuItem.)

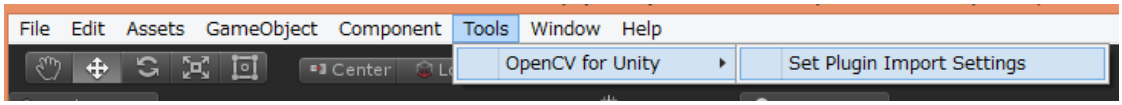
Beta2 [iOS] Fix problem when working with Metaio(UnityAppController problem). [Common]Add [System.Serializable] to basic class. [Common] change folder name from “OpenCVForUnity/OpenCVForUnity_Editor/” to “OpenCVForUnity/Editor/”. [iOS]Move “OpenCVForUnity/OpenCVForUnity_Editor/opencv2.framework” to “OpenCVForUnity/Plugins/iOS”folder.

Quick setup procedure to run the example scenes (Setup Tutorial Video)

1. Import the OpenCVForUnity.package. You do not need to import plug-in files for platforms not supported by your project.



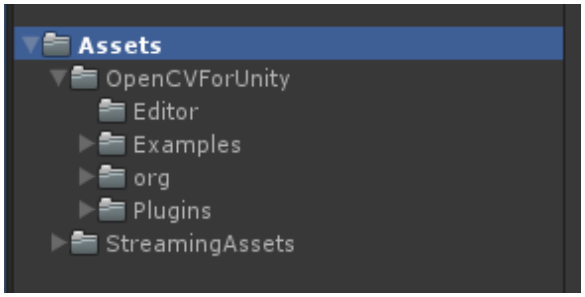
2. Select MenuItem[Tools/OpenCV for Unity/Set Plugin Import Settings].



3. Move the “OpenCVForUnity/StreamingAssets/” folder to the “Assets/” folder.
4. Please set [PlayerSettings]-[Resolution and Presentation]-[Orientation]-[Default Orientation : Landscape Left] when you build the example scene.
5. Add all of the “***.unity” in the “OpenCVForUnity/Examples” folder to [Build Settings] – [Scene In Build].

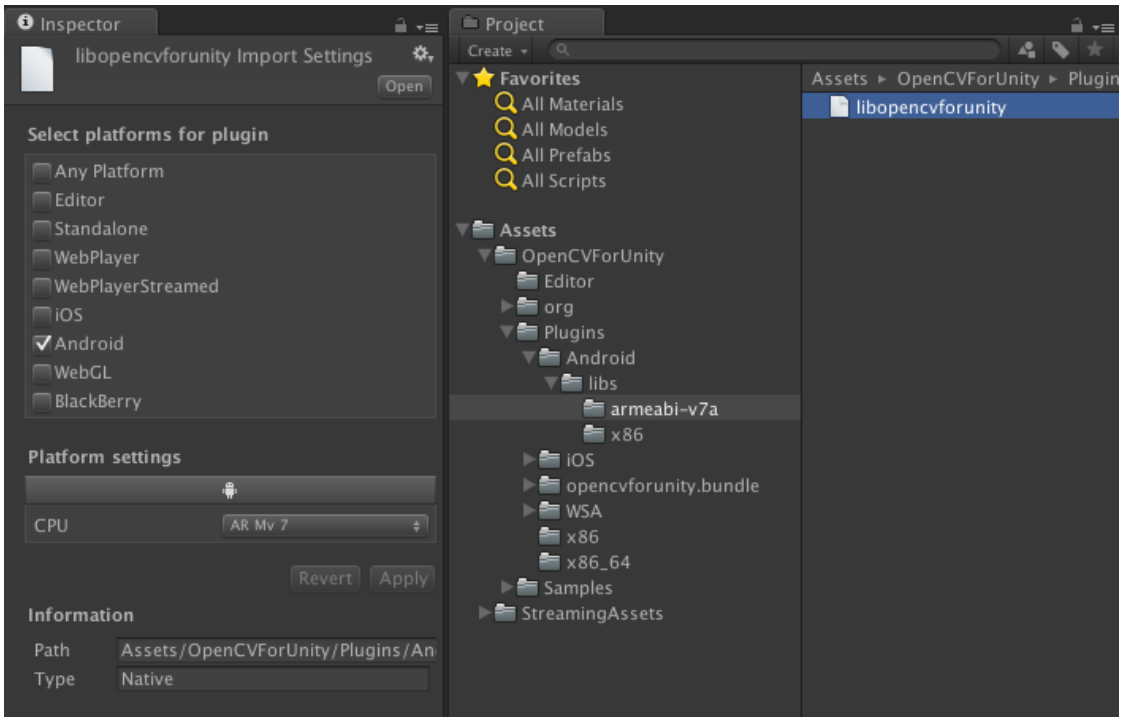
※For setup of linux platform, you need to build the OpenCV library. Please see Linux Setup Procedure.

Screenshot after the setup

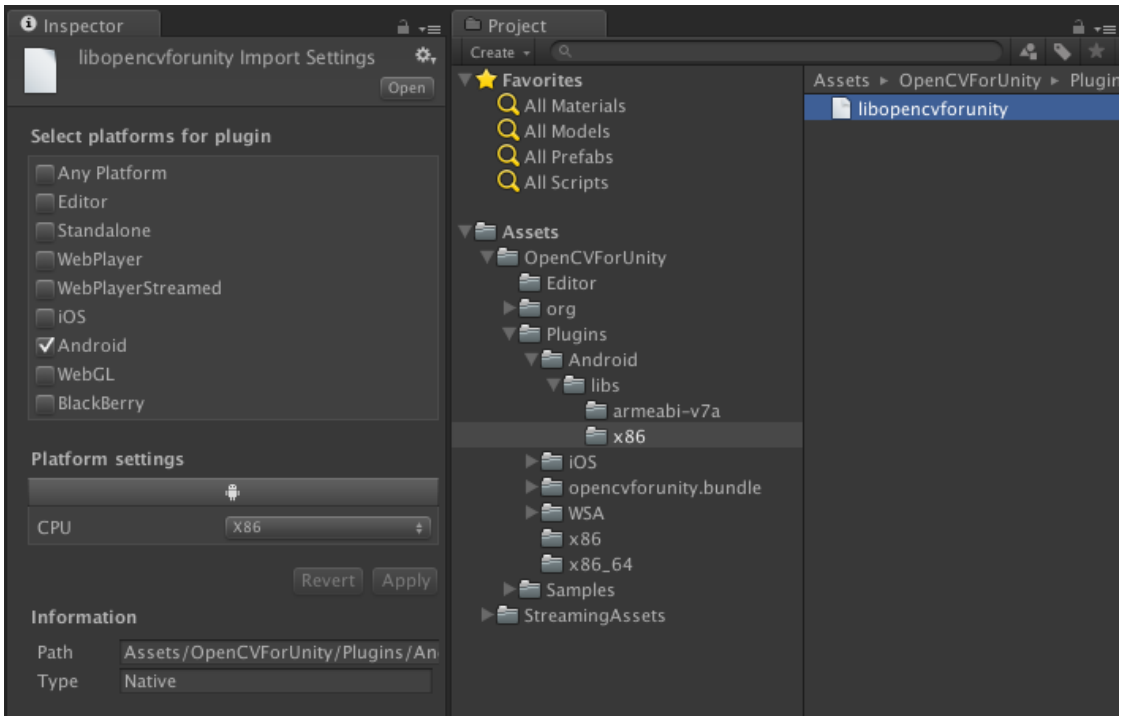


Android Setup Procedure

- “OpenCVForUnity/Plugins/libs/armeabi-v7a/*.so” - Select platform Android and CPU ARMv7 in Inspector.



- “OpenCVForUnity/Plugins/libs/x86/*.so” – Select platform Android and CPU x86 in Inspector.

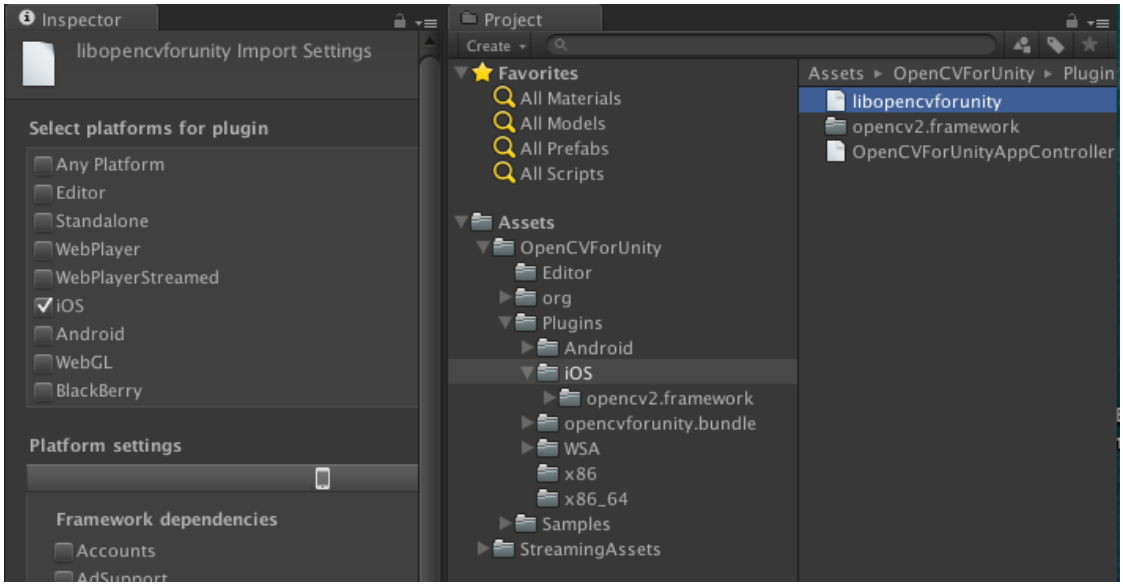


- Put the file that you want to use for Utils.getFilePath() in the “Aseets/StreamingAssets/” folder. (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)

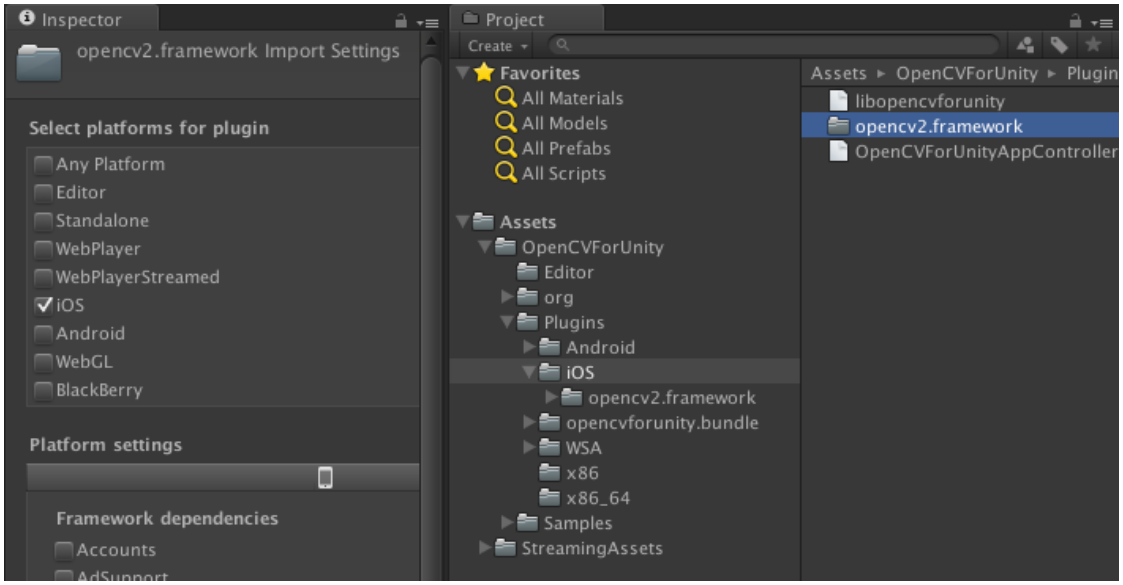
- If you do not use opencv_contrib module, build size will be reduced by using native plugin file excluding opencv_contrib module.
  1. Replace the OpenCVForUnity/Plugins/Android/libs folder to the OpenCVForUnity/Extra/exclude_contrib/Android/libs folder.
  2. Select MenuItem[Tools/OpenCV for Unity/Set Plugin Import Settings].
  3. Delete the OpenCVForUnity/Assets/OpenCVForUnity/org/opencv_contrib folder and the OpenCVForUnity/Examples/ContribModules folder.

iOS Setup Procedure

- “OpenCVForUnity/Plugins/iOS/libopencvforunity.a” – Select platform iOS in Inspector.



- “OpenCVForUnity/Plugins/iOS/opencv2.framework” – Select platform iOS in Inspector.



- Put the file that you want to use for Utils.getFilePath() in the “Aseets/StreamingAssets/”folder. (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)
- When "-ObjC" is set to "OTHER_LDFLAGS" by other Asset, the following error

may occur.

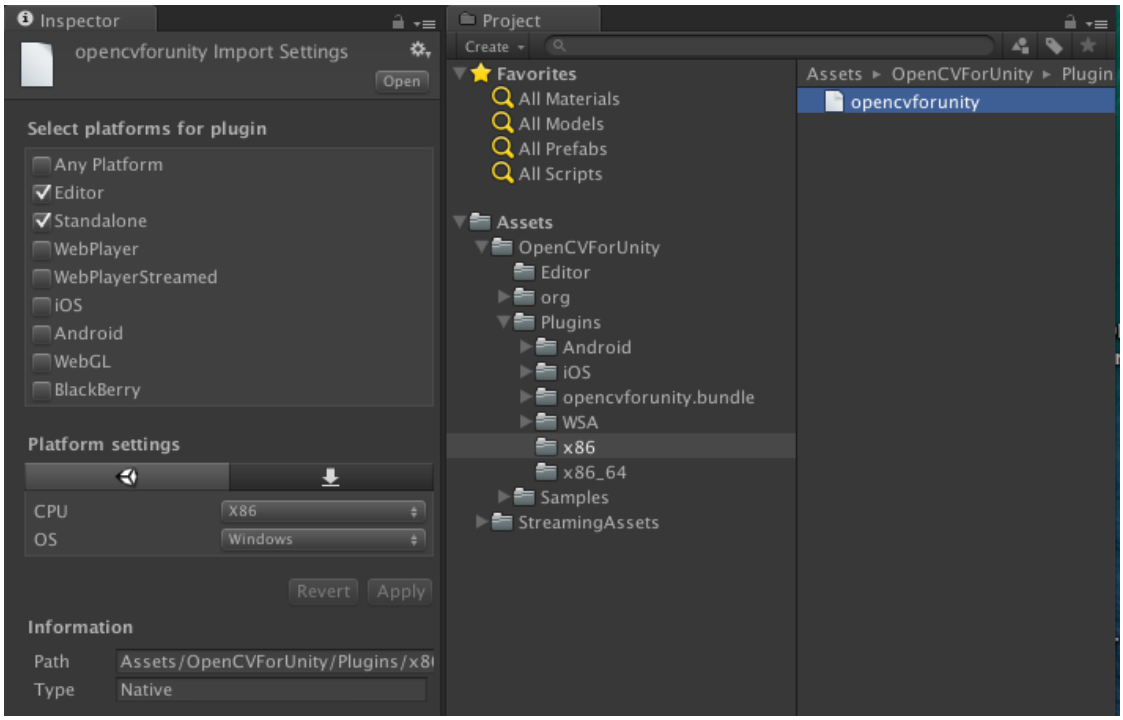
```
Undefined symbols for architecture armv7:

  "_OBJC_CLASS_$_ALAssetsLibrary", referenced from:

       objc-class-ref in opencv2(cap_ios_video_camera.o)

ld: symbol(s) not found for architecture armv7

clang: error: linker command failed with exit code 1 (use -v to see invocation)
```

In that case, add “proj.AddFrameworkToProject (target, "AssetsLibrary.framework", false);” to “Assets/OpenCVForUnity/Editor/iOS_BuildPostprocessor.cs”.

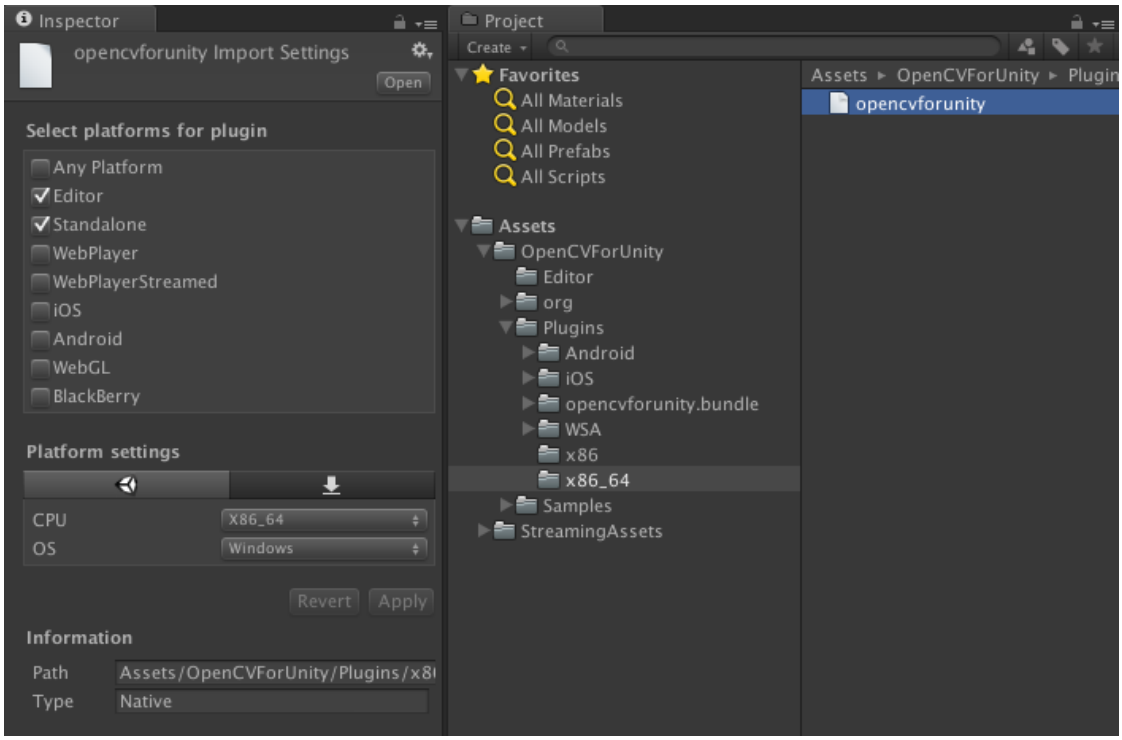
- If you do not use opencv_contrib module, build size will be reduced by using native plugin file excluding opencv_contrib module.
  1. Replace the OpenCVForUnity/Plugins/iOS folder to the OpenCVForUnity/Extra/exclude_contrib/iOS folder.
  2. Select MenuItem[Tools/OpenCV for Unity/Set Plugin Import Settings].
  3. Delete the OpenCVForUnity/Assets/OpenCVForUnity/org/opencv_contrib folder and the OpenCVForUnity/Examples/ContribModules folder.

Win Standalone Setup Procedure

- “OpenCVForUnity/Plugins/x86/opencvforunity.dll” – Select platform Editor,Standalone and CPU x86 and OS Windows in Inspector.



- “OpenCVForUnity/Plugins/x86_64/opencvforunity.dll” – Select platform Editor,Standalone and CPU x86_64 and OS Windows in Inspector.



- Put the file that you want to use for Utils.getFilePath() in the “Aseets/StreamingAssets/”. (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)
- If you want to use more video formats with the "Video Capture (string filename)" or "VideoWriter" method, setup is required.

  1)Download "OpenCV for Windows Version 3.3.0"(http://opencv.org/downloads.html).

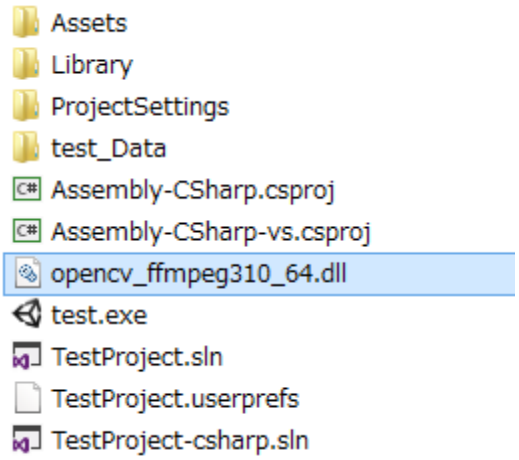
  2)Set PATH variable to "opencv_ffmpeg330.dll" or "opencv_ffmpeg330_64.dll".

  if 32bit, "¥path¥to¥opencv¥build¥x86¥vc12¥bin¥".

  if 64bit, "¥path¥to¥opencv¥build¥x64¥vc12¥bin¥".

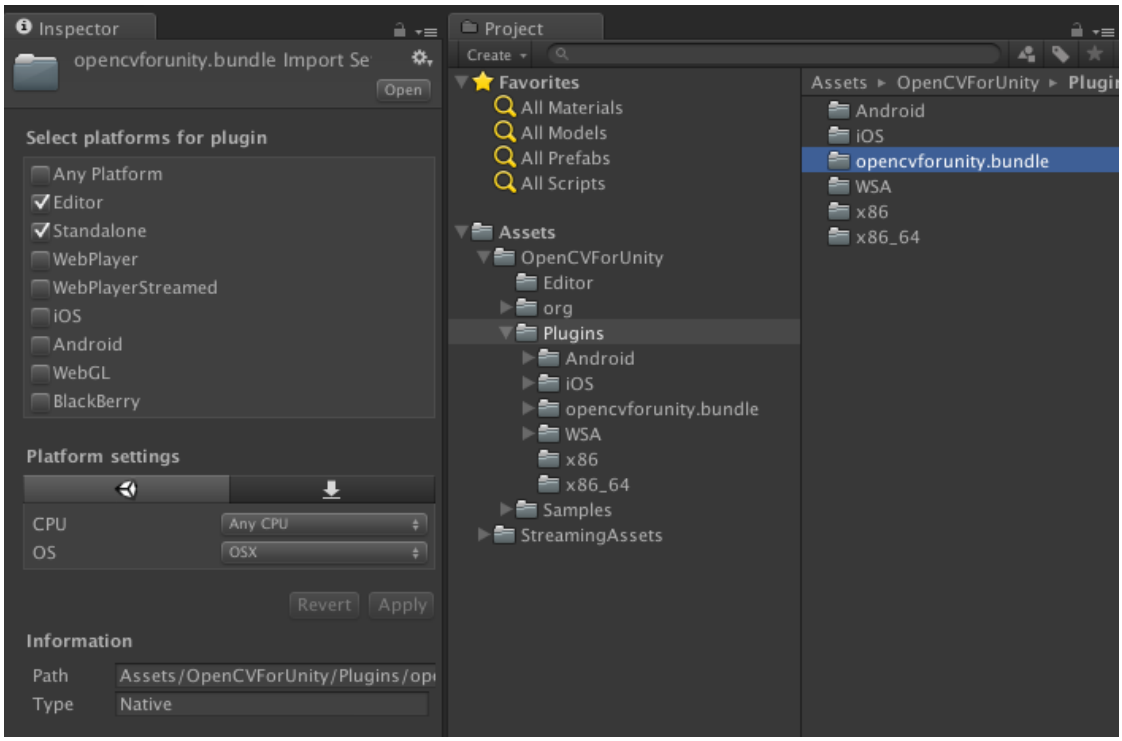
  Or

  2)Copy to Project Folder.


Assets
Library
ProjectSettings
test_Data
Assembly-CSharp.csproj
Assembly-CSharp-vs.csproj
opencv_ffmpeg310_64.dll
test.exe
TestProject.sln
TestProject.userprefs
TestProject-csharp.sln

Mac Standalone Setup Procedure

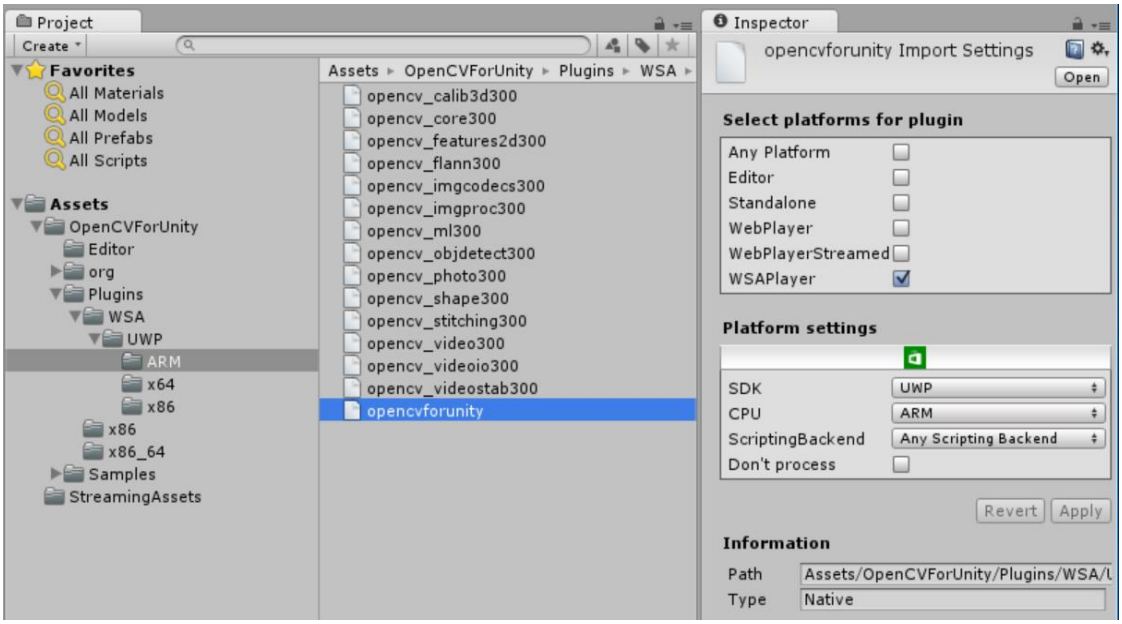
- "OpenCVForUnity/Plugins/opencvforunity.bundle" – Select platform Editor,Standalone and CPU x86_64 and OS OSX in Inspector.



- Put the file that you want to use for Utils.getFilePath() in the "Aseets/StreamingAssets/". (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)

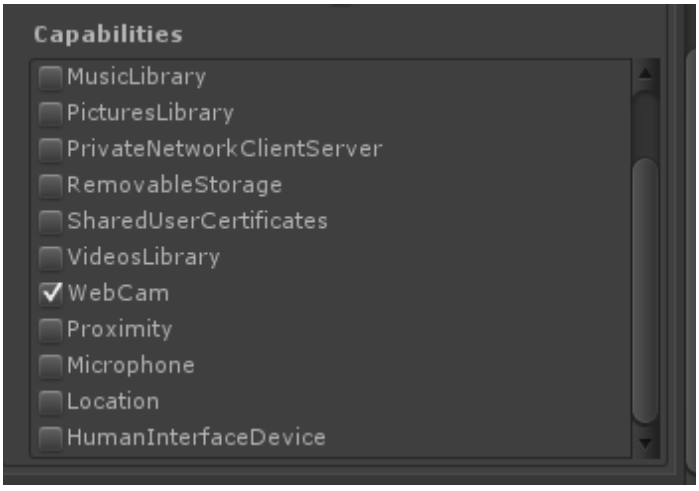
UWP Setup Procedure

- “OpenCVForUnity/Plugins/WSA/UWP/ARM/*.dll” - Select platform WSAPlayer and SDK81 and CPU ARM in Inspector. Set “x86” and ”x64” in the same way as “ARM”.



- Put the file that you want to use for Utils.getFilePath() in the “Aseets/StreamingAssets/”. (haarcascade_frontalface_alt.xml is for OpenCVForUnitySample.scene. Please copy only when necessary.)

- If use webCamTextue class, Please choose “WebCam” in [PlayerSettings]-[PublishingSettings]-[Capabilities].



Linux Setup Procedure

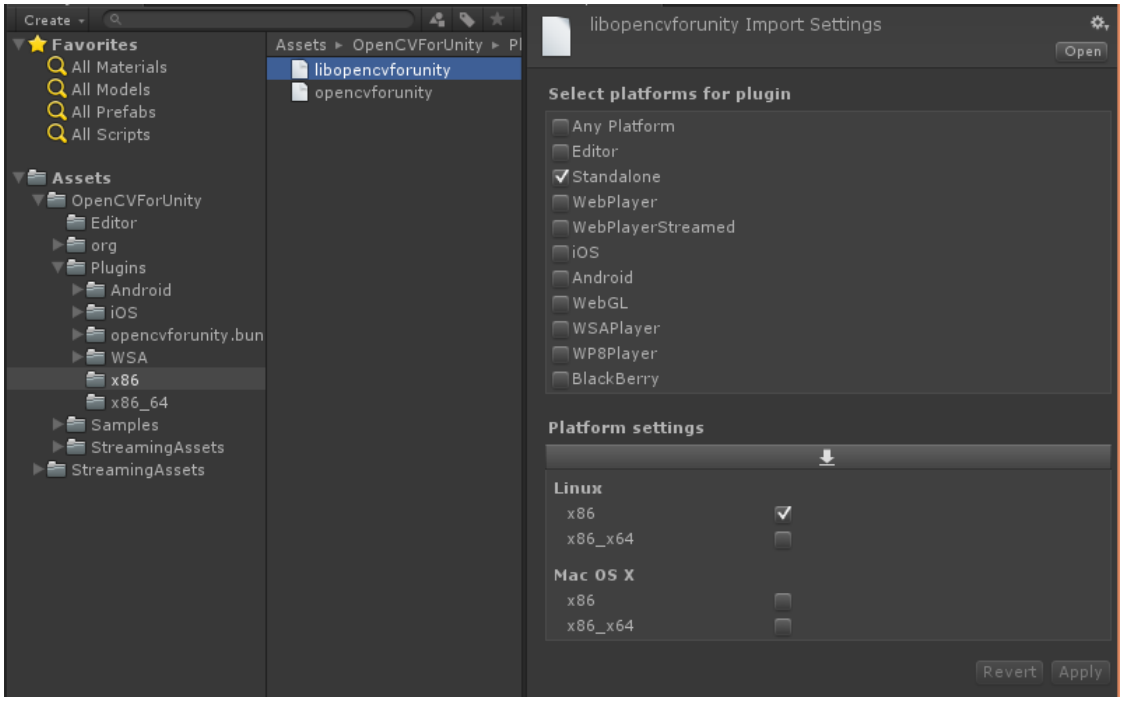
- Install OpenCV3.3.0 (https://github.com/opencv/opencv/tree/87c27a074db9f6d9d60513f351daa903606ca370) with opencv-contrib(https://github.com/opencv/opencv_contrib/tree/2a9d1b22ed76eb22fad1a5edf6faf4d05f207b13)

Example of Install command

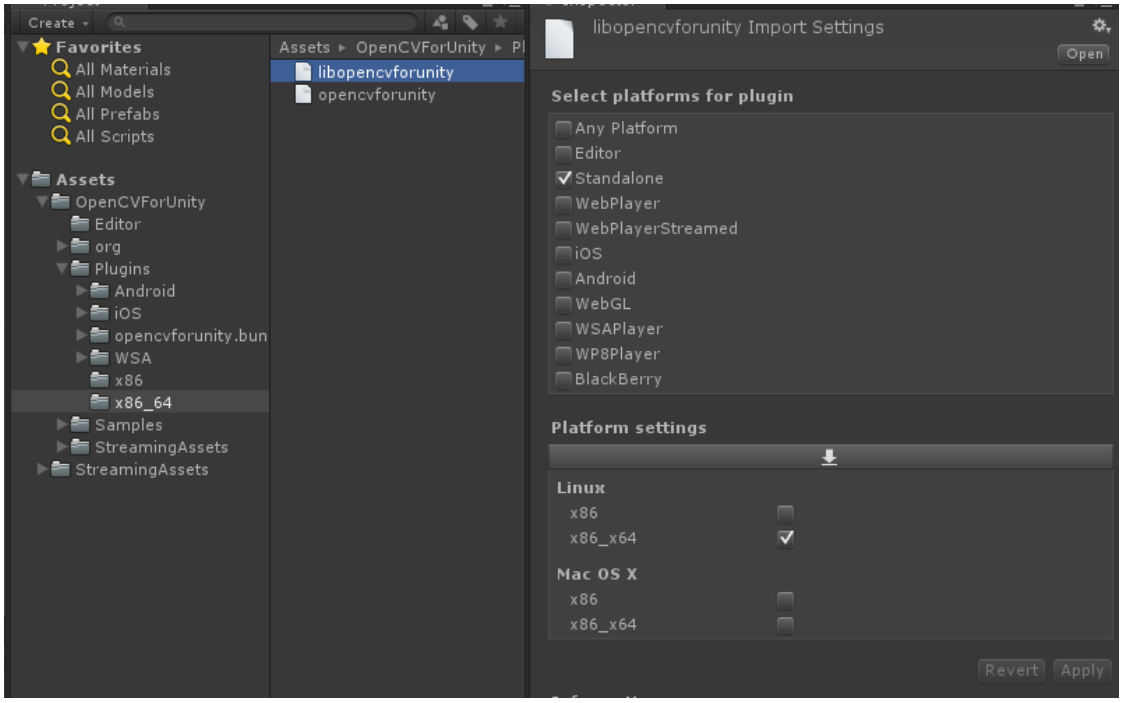
```
#!/bin/sh

sudo apt-get -y install build-essential cmake git pkg-config libdc1394-22 libdc1394-22-dev libjpeg-dev libpng12-dev libtiff5-dev libjasper-dev libavcodec-dev libavformat-dev libswscale-dev libxine2-dev libgstreamer0.10-dev libgstreamer-plugins-base0.10-dev libv4l-dev libtbb-dev libqt4-dev libfaac-dev libmp3lame-dev libopencore-amrnb-dev libopencore-amrwb-dev libtheora-dev libvorbis-dev libxvidcore-dev x264 v4l-utils unzip
mkdir opencv
cd opencv
wget https://github.com/opencv/opencv/archive/87c27a074db9f6d9d60513f351daa903606ca370.zip
unzip 87c27a074db9f6d9d60513f351daa903606ca370.zip
wget https://github.com/opencv/opencv_contrib/archive/2a9d1b22ed76eb22fad1a5edf6faf4d05f207b13.zip
unzip 2a9d1b22ed76eb22fad1a5edf6faf4d05f207b13.zip
cd opencv-87c27a074db9f6d9d60513f351daa903606ca370
mkdir build
cd build
cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local -D WITH_TBB=ON -D BUILD_opencv_python2=OFF -D BUILD_opencv_python3=OFF -D WITH_V4L=ON -D OPENCV_EXTRA_MODULES_PATH=../../opencv_contrib-
```

```
2a9d1b22ed76eb22fad1a5edf6faf4d05f207b13/modules ..
make -j $(nproc)
sudo make install
sudo /bin/bash -c 'echo "/usr/local/lib" > /etc/ld.so.conf.d/opencv.conf'
sudo ldconfig
```

- “OpenCVForUnity/Plugins/x86/libopencvforunity.so” – Select platform Editor,Standalone and CPU x86 and OS Linux in Inspector.



- “OpenCVForUnity/Plugins/x86_64/libopencvforunity.so” – Select platform Editor,Standalone and CPU x86_64 and OS Linux in Inspector.

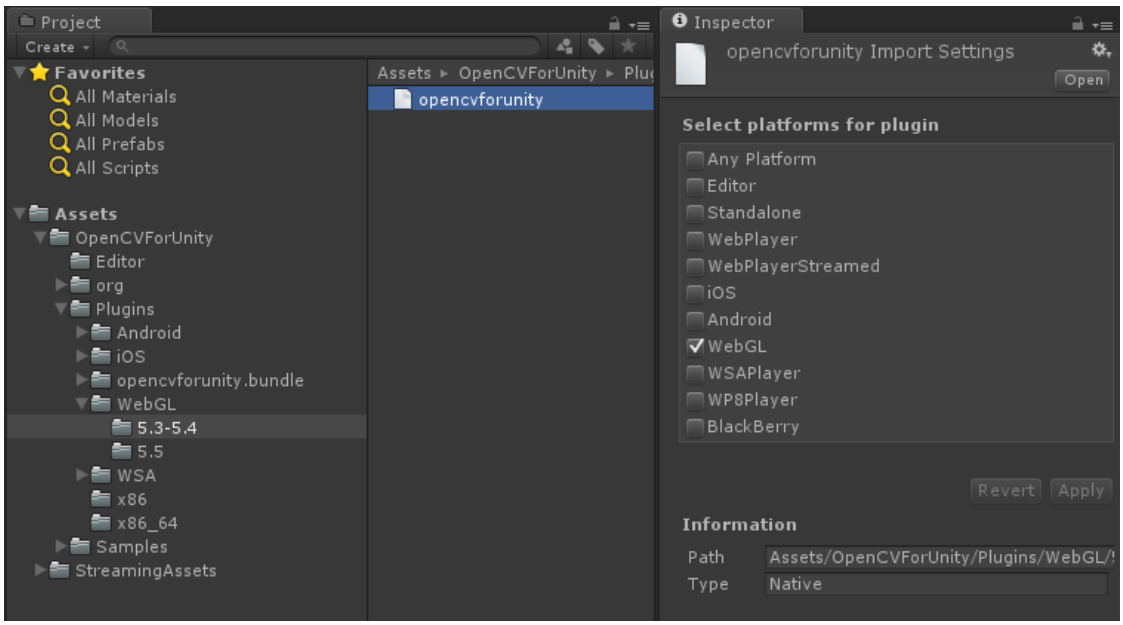


- Put the file that you want to use for Utils.getFilePath() in the "Aseets/StreamingAssets/". (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)

- Additional Setting is required to run on the editor. http://forum.unity3d.com/threads/native-plugin-in-editor-steam-specifically.384970/

WebGL Setup Procedure

- “OpenCVForUnity/Plugins/WebGL/unity_version/opencvforunity.bc” – Select platform WebGL in Inspector. By Selecting MenuItem [Tools/OpenCV for Unity/Set Plugin Import Settings], You can easily set up.



- Put the file that you want to use for Utils.getFilePathAsync() in the “Aseets/StreamingAssets/”. In Case of WebGL platform, you need to use Utils.getFilePathAsync() instead of Utils.getFilePath(). (haarcascade_frontalface_alt.xml is for OpenCVForUnityExample.scene. Please copy only when necessary.)
- In the WebGL (asm.js) platform, the calculation result of Float type may be significantly different from other platforms. When using the OpenCV’s method that use the Mat class (CvType is CV_32F) as an argument, you need to pay attention to the calculation precision.

Q & A

Q1.

Asset package size is large. Is there a way to reduce?

A1.

Please remove plugin folders of non-output target platforms that are included in the package.

Q2.

Support Web platform?

A2.

Since the Unity Web Player does not support the native plugin, “OpenCV for Unity" does not support "WebPlayer Platform”.

A WebGL platform was added as an alternative. (Unity 5.3 or higher).

Q3.

How do learn the details of OpenCV's method and argument?

A3.

Please refer to OpenCV official document (http://docs.opencv.org/3.3.0/index.html) and OpenCV Tutorials (http://docs.opencv.org/3.3.0/d9/df8/tutorial_root.html) for the details of the argument of the method..

Q4.

How can I convert Mat class operators defined in C++?

A4.

Way to translation of Mat class operators defined in C++.

https://enoxsoftware.com/opencvforunity/way-to-translation-of-mat-class-operators-defined-in-cpp/

Q5.

“DllNotFoundException: opencvforunity” is displayed on the console when run the example scene.

A5.

The plugin does not seem to be loaded correctly. Please check the setup procedure.

Q6.

“ArgumentException: The output Mat object has to be of the same size” is displayed on the console when run the example scene.

A6.

After having setup Plugin, Plugin may work well when you reboot Unity.

Q7.

“Level 'Texture2DtoMatExample' (-1) could not be loaded because it has not been added to the build settings.” is displayed on the console when run the example scene.

A7.

Please add all of “***.unity” scenes into the “Assets/OpenCVForUnity/Examples” folder to [Build Settings] – [Scene In Build].

Q8.

In DetectFaceExample or WebCamTextureDetectFaceExample, red rectangle is not displayed around a face.

A8.

You might have failed to read the “haarcascade_frontalface_alt.xml”. Please confirm whether there is the “StreamingAssets” folder at the right position.