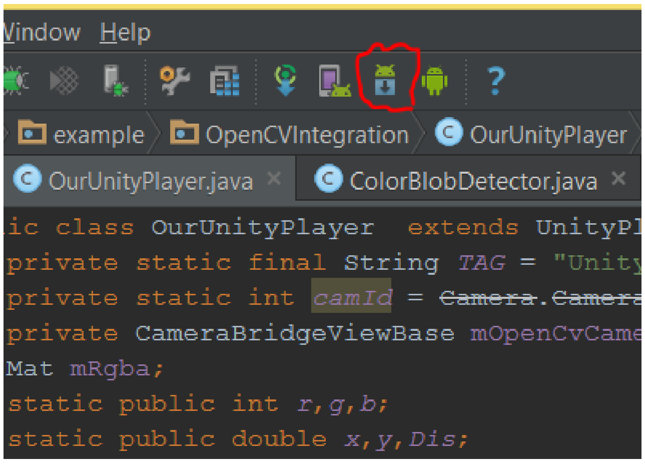
Guide:

*Note this guide is ok for version Unity 5.4.0f3 and OpenCV 3.1 *

Preperations:

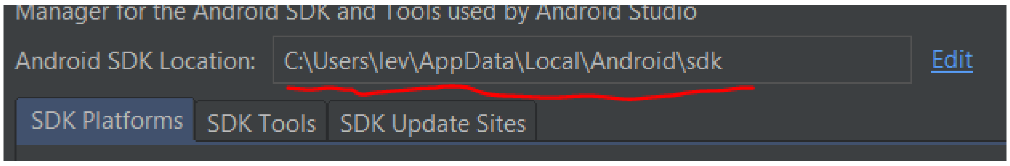
* download Unity from https://unity3d.com/get-unity/download
* download Android Studio from https://developer.android.com/studio/index.html
* download OpenCV for android from http://opencv.org/downloads.html

First you need to get SSIG key to develop on your phone.
Plug your phone to the computer
(notice it should be in "developer mode" .. if you don't know how to do it check on google ☺)
To get This key you should enter: https://dashboard.oculus.com/tools/osig-generator/
Follow those instructions:
Go to Android Studio -> SDK manager



```
ic class OurUnityPlayer  extends UnityPl
private static final String TAG = "Unity
private static int camId = Camera.Camera
private CameraBridgeViewBase mOpenCvCame
Mat mRgba;
static public int r,g,b;
static public double x,y,Dis;
```

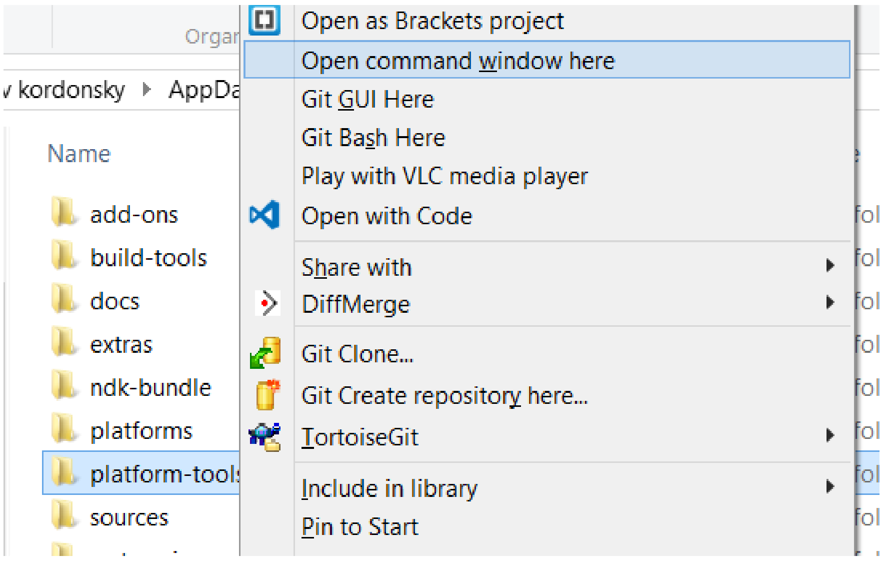
Go to the SDK folder:



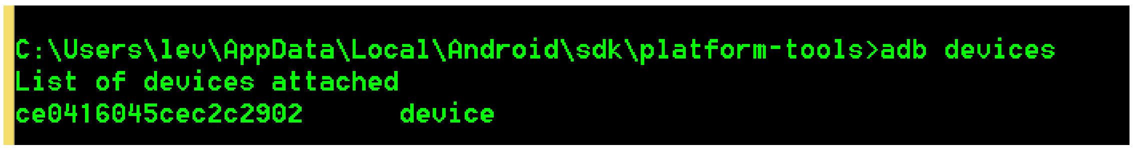
Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: C:\Users\lev\AppData\Local\Android\sdk Edit

In that Folder , Press shift+right Mouse on platform-tools to enter cmd in that folder
 (you can do at any other cmd way you like..)



Now write "adb devices" and you should get :



```
C:\Users\lev\AppData\Local\Android\sdk\platform-tools>adb devices
List of devices attached
ce0416045cec2c2902      device
```

This is your device ID – you need this to the website to get your SSIG key.
Put it in a folder you can find later.. you will need it.

Unity Project Start

Open new Unity Project .

Add Sphere (GameObject -> 3D object -> sphere)

Add script to Sphere

```
using UnityEngine;
using System.Collections;

public class SphereColor : MonoBehaviour {

    // Use this for initialization
    private TextMesh textObject;
    private AndroidJavaClass ajc;
    void Start () {
        textObject = GameObject.Find("TryText").GetComponent<TextMesh>();
        ajc = new AndroidJavaClass("com.example.OpenCVIntegration.UnityTalk");

    }

    // Update is called once per frame
    void Update () {
        int r = ajc.CallStatic<int> ("getR");
        int g = ajc.CallStatic<int> ("getG");
        int b = ajc.CallStatic<int> ("getB");
        textObject.text = r.ToString() + " " + g.ToString() + " " + b.ToString() ;
        GameObject.Find("Sphere").GetComponent<Renderer>().material.color =
            new Color(realRGBtoUnityRGB(r),realRGBtoUnityRGB(g),realRGBtoUnityRGB(b));
    }

    public float realRGBtoUnityRGB(int color){
        return ((float)color / 255);
    }
}
```

*Notice the sphere's name is "Sphere"

*ajc will be the java class that we will build later , this class has static methods getR,getG,getB that return int.

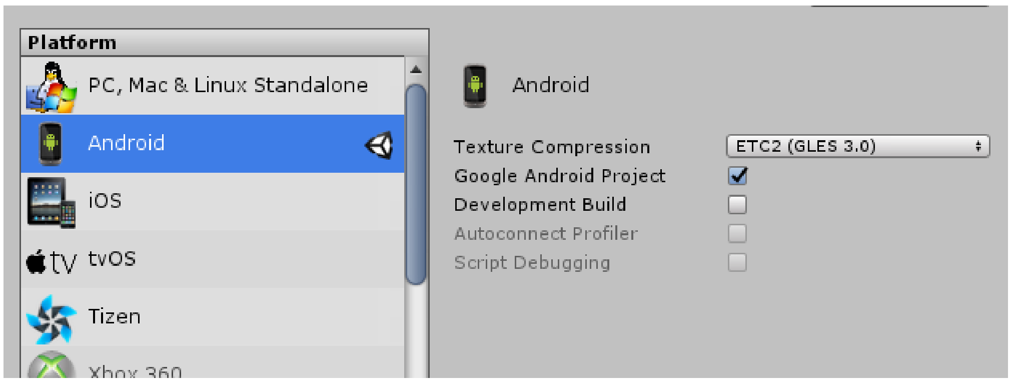
Open a new folder in your Assets, name it "Plugins".

In Plugins open a folder named "Android".

In Android open a folder named "assets". (final path should be Assets \Plugins\Android\assets)

Copy Your SSIG Key to that folder!

Go to File -> Build Settings
Choose Android and check Google Android Project
(You might need to install SDK,NDK for that.. do that with android studio's SDK manager)
Change "Texture Compression" to ETC2 (GLES 3.0)



Texture Compression: ETC2 (GLES 3.0)
Google Android Project: ☑
Development Build: ☐
Autoconnect Profiler: ☐
Script Debugging: ☐

Export to a folder

Android Project Start

Open Android Studio :

File -> New -> Import Project -> choose the folder you exported to (from previous page)

(as for this unity version, you will have two folders – OVRPlugin and #yourname)

choose #yourname folder.

Notice that android studio will ask you to choose a folder when you use import project – choose a new folder name

And accept the "do you want to create new folder"

From now on we will only use this new folder.

For some reason I had some files missing in my OVRPlugin folder so I copied

#yourNewFolder\#yourAppName\src\main\res -> drawable and values (copy both folders)

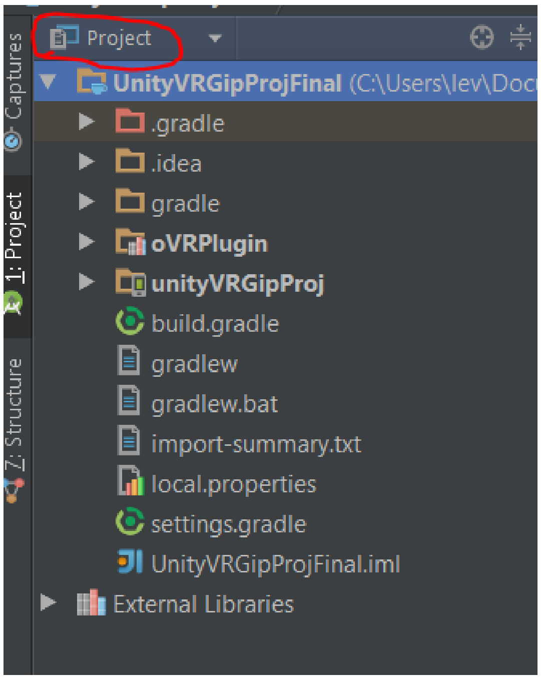
To #yourNewFolder \oVRPlugin\src\main\res\

Do those steps in case you see problems in Android Studio .

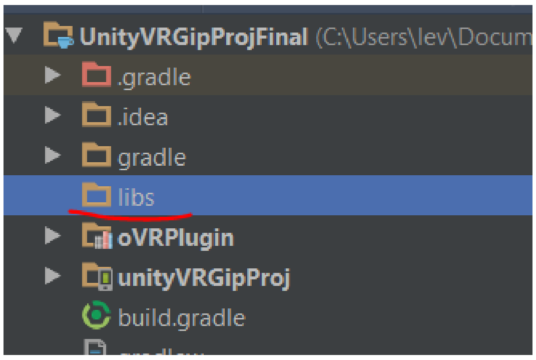
Build the project just to make sure everything is ok

OpenCV static initialization:

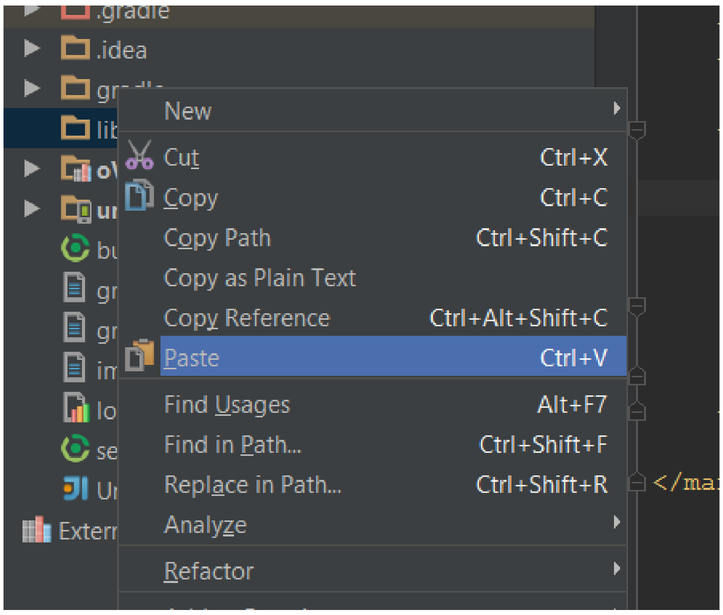
Go to Project view



Add new folder "libs" (right mouse on main folder -> new -> directory)

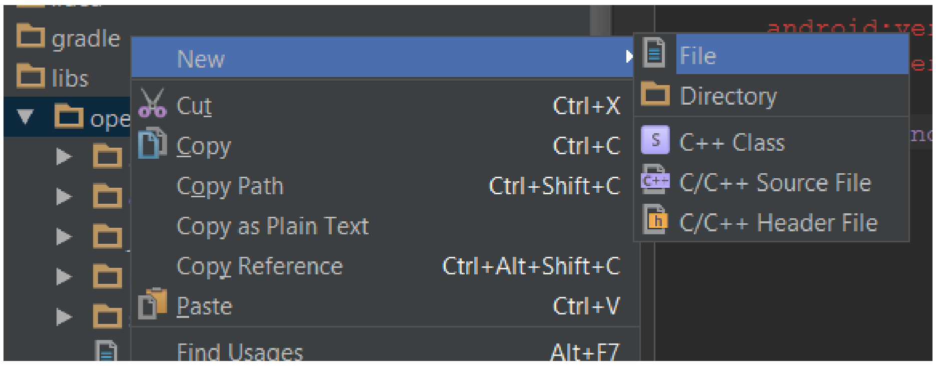


Copy the folder OpenCVFolder\sdk\java into your new "libs"



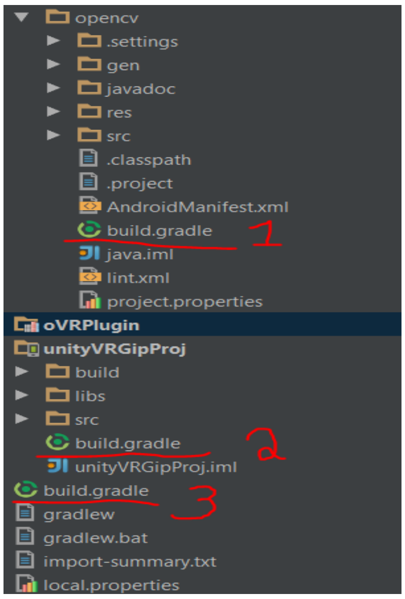
call the new folder "opencv"

Add new file in "opencv" new folder and Call it "build.gradle"



Notice now you have 3 "build.gradle" (actually 4 but OVRPlugin doesn't matter..)

1 is now empty

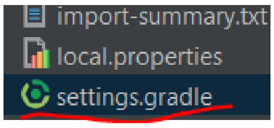


Copy this to the new file:

```
apply plugin: 'com.android.library'

buildscript {
    repositories {
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle:1.5.0'
    }
}

android {
    compileSdkVersion 23
    buildToolsVersion "23.0.2"

    defaultConfig {
        minSdkVersion 9
        targetSdkVersion 23
    }

    sourceSets{
        main{
            manifest.srcFile 'AndroidManifest.xml'
            java.srcDirs = ['src']
            resources.srcDirs = ['src']
            res.srcDirs = ['res']
            aidl.srcDirs = ['src']
        }
    }
}
```

*Notice that "buildscript" part should be similar to same code in file3(main folder)
And "android" part – the versions – should be similar to file2 (yourAppName folder)

Go to setting.gradle (main folder)



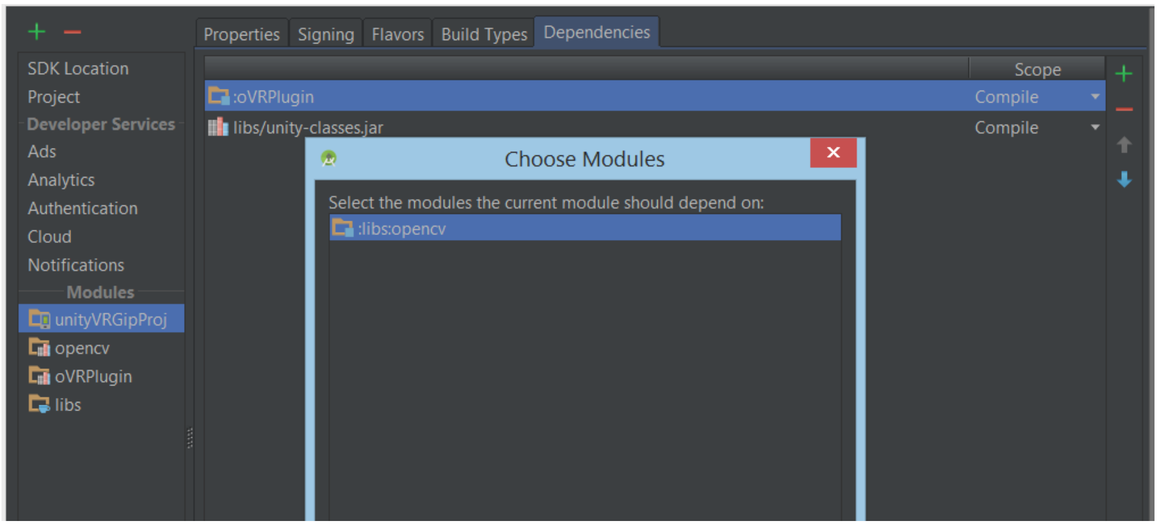
and add:

```
include ':libs:opencv'
```

you can click Sync now and it should be ok... ☺

Go to OpenCVFolder\sdk \native\libs
Now in this folder you have many folders – but you need only one of them , it depends on your phones architecture.
For Samsung S7 I only needed " armeabi-v7a"
Copy the folder to
#yourNewFolder\#yourAppName\src\main\jniLibs

Go to File -> Project Structure
Select #yourAppName
Click Dependencies
Click +
Select Module Dependencies
Select :libs:opncv and press OK



Select the modules the current module should depend on:
:libs:opencv

OpenCv is now integrated in your project.
To initialize it in your app use:

```
static {
    if (!OpenCVLoader.initDebug()) {
        Log.d(TAG, "Internal OpenCV library not found. Using OpenCV Manager for
initialization");
    } else {
        Log.d(TAG, "OpenCV library found inside package. Using it!");
    }
}
```

Add

```
<uses-permission android:name="android.permission.CAMERA"/>
```

To your manifest

Create a new Class named UnityTalk to talk to Unity scripts.

```
public class UnityTalk {
    public static int getR(){
        return OurUnityPlayer.r;
    }
    public static int getG(){
        return OurUnityPlayer.g;
    }
    public static int getB(){
        return OurUnityPlayer.b;
    }
}
```

Create a new Class to be your Main Class (We called it OurUnityPlayer)

Example in next page!

* make sure you override from UnityPlayerActivity

* in your manifest make sure starting activity is yours:

```
<activity android:label="@string/app_name"
android:screenOrientation="sensorLandscape"
android:launchMode="singleTask"
android:configChanges="mcc|mnc|locale|touchscreen|keyboard|keyboardHidden|navigation|orientation|screenLayout|uiMode|screenSize|smallestScreenSize|fontScale"
android:name="com.example.OpenCVIntegration.OurUnityPlayer">
  <intent-filter>
```

* OnCameraFrame is where you make your ImageProcessing

```java
public class OurUnityPlayer  extends UnityPlayerActivity implements CameraBridgeView-
Base.CvCameraViewListener2 {
........................

    public static SceneEnum OurScene;
    public enum SceneEnum{
        First,
        Second
    }

    static {
        if (!OpenCVLoader.initDebug()) {
            Log.d(TAG, "Internal OpenCV library not found. Using OpenCV Manager for initialization");
        } else {
            Log.d(TAG, "OpenCV library found inside package. Using it!");
        }
    }

    @Override
    protected void onCreate(Bundle bundle) {
        super.onCreate(bundle);
        getWindow().addFlags(WindowManager.LayoutParams.FLAG_KEEP_SCREEN_ON);
        JavaCameraView myView = new JavaCameraView(getApplicationContext(),camId);
        addContentView(myView, new ViewGroup.LayoutParams(ViewGroup.LayoutParams.FILL_PARENT, View-
Group.LayoutParams.FILL_PARENT));
        mOpenCvCameraView = myView;
        mOpenCvCameraView.enableView();
        mOpenCvCameraView.setVisibility(SurfaceView.VISIBLE);
        mOpenCvCameraView.setCvCameraViewListener(this);
        OurScene = SceneEnum.First;
    }

    @Override
    protected void onDestroy () {
        super.onDestroy();
        if (mOpenCvCameraView != null)
            mOpenCvCameraView.disableView();
    }

    @Override
    protected void onPause() {
        super.onPause();
        if (mOpenCvCameraView != null)
            mOpenCvCameraView.disableView();
    }

    @Override
    protected void onResume() {
        super.onResume();
    }

    @Override
    public void onCameraViewStarted(int width, int height) {
        mRgba = new Mat(height, width, CvType.CV_8UC4);
        mDetector = new ColorBlobDetector();
        SPECTRUM_SIZE = new Size(200,64);
    }

    @Override
    public void onCameraViewStopped() {
        mRgba.release();
    }

        @Override
    public Mat onCameraFrame(CameraBridgeViewBase.CvCameraViewFrame inputFrame) {
        mRgba = inputFrame.rgba();
        int height = mRgba.height();
        int width = mRgba.width();
        double[] pixel = mRgba.get(((int)height/2),((int)width/2));
        r = (int)pixel[0];
        g = (int)pixel[1];
        b = (int)pixel[2];
        return mRgba;
    }

}
```

Hope You Made It!!

For any question please send us mail to:

Levk3112@gmail.com

Or

Noyhess@gmail.com

With the headline "UnityOpenCV Question"

And we will be glad to help.