**Internet of Things using Augmented Reality in Unity IoTAR (Notes)**

**Section 1: Getting Started**

Lecture 1 – Introduction (Video uploaded)

Lecture 2 – Prerequisites for the Course - Bill of Materials

Hey guys so before you officially start with this course you need to ensure that you have all the training material and tools for this course. You will need to purchase the following:

Hardware which is the Particle Photon, soldering iron, breadboard and wires.

Sensors that interface to the Particle Photon.

Unity Assets to visualize the data in Augmented Reality.

Ofcourse, you can work around buying some of the components and assets however they will cost you more time and effort if you are not as experienced. If you are just starting out it is recommended that you stick to the prescribed training material for this course to save you on frustration.

The Bill of Materials for the Training Material is attached in the Resource Section Attached to this lecture. These are all NON-Affiliated links, meaning that I am not affiliated with any of these Vendors.

Resources for this lecture

IOTAR BOM for Course.xlsx

Lecture 3 – How to take this course (Video uploaded)

Lecture 4 - [NEW] Introduction to Augmented Reality and Vuforia Features (Video Uploaded)

**Section 2: Lab\_1 - Web Controlled LED**

Lecture 5 - Setup You Particle Photon and Blink LED over Web\_YT (Video uploaded)

**Section 3: Lab\_2 - Basic AR Cube App**

Lecture 6 - Installing Unity and Vuforia (Video Uploaded)

Lecture 7 – Vuforia Update AR Camera Issue - IMPORTANT!

Some Students have mentioned that they are getting errors with the AR camera not showing its details in Unity Inspector. If this is the case with you then you can download earlier versions of Vuforia from their developers portal. The version I used is V6.1-17, however if they make significant changes, please inform me as soon as you can, and i will update the lectures with the latest changes that Vuforia have made.

Make sure you download the 32-bit Unity SDK, as Vuforia may NOT work with 64bit Unity.

If you are getting white targets, then try rolling back to Unity 5.3. or 5.1 - 32bit

Here is the link to the Archive Vuforia SDK's on Github.

https://www.dropbox.com/s/luekxq17pllo5xs/vuforia-unity-6-1-17.unitypackage?dl=0

-------------------------------------------------------

Image Target Textures not show up (white texture shown) at scene (Unity3D)

January 31, 2017 - 12:59am

1. Check "Asset > Editor > QCAR > ImageTargetTextures > YourDB"

2. If your image imagename\_scaled.jpg doesn't true (black/white/transparant) delete it.

3. Drag your Image Texture to “Asset > Editor > QCAR > ImageTargetTextures > YourDB"

4. Check Image Target in Hierarchy and then ImageTargetBehaviour in Inspector, Choose again your database.

5. Save scene

----------------------------------------------------------

Vuforia Version 6.2 Changelog

To insert API key, in Inspector/Vuforia Behavior=> Click Open Vuforia Configuration.

Lecture 8 - Simple Augmented Reality Cube to Test Vuforia SDK in Unity (Video Uploaded)

Lecture 9 – Notes on Troublefree Unity-Vuforia Installation on Windows 10:-=====================================================================================

-- July 1, 2017

-- Prashanth (Andy) Menon

-- AR course - Notes on troublefree Unity-Vuforia Installation on Windows 10:

--=====================================================================================

--=====================================================

-- Choosing the Unity Version

--=====================================================

I chose the Unity version from the instructions to fix the White Images in Section 3, Course Update 8.

Based on this fix, I went for the final v5.3.8f2 (64-bit) Personal from the Unity downloads archive page

and worked myself back into the lectures.

--=======================================================

-- Why use the Installer and not the individual downloads

--=======================================================

Reason:

The WebPlayer was not one of the components in the individual downloads on the Unity Archive Page. But when using the installer,

the Webplayer is provided as one of the options during installation. As I was installing a relatively older version of Unity, I didn't want

to download the latest version of the WebPlayer and have it conflict with this older Unity version.

Besides, the installer will help reconcile all component versions automatically (for us noobs) which otherwise may cause issues if they're installed separately.

During installation, the following components were selected:

1. Unity 5.3.8f2

2. Web Player

3. Standard Assets

4. Windows Build Support

--========================================================================

-- Following default components were UNCHECKED to speed up installation

--========================================================================

1. Microsoft Visual Studio 2015

2. Documentation

--========================================================================

-- Vuforia Installation

--========================================================================

Initially I downloaded the Vuforia v6.1 package from Dropbox location https://github.com/reigngt09/IoTAR/blob/master/Lab\_2\_Basic\_AR\_Cube\_App/IOTAR.unitypackage

and installed it as per the lecture.

But when working with the Cube project, I downloaded the v6.2 from Vuforia download page as advised in the lecture and imported it into Unity.

--========================================================================

Making this work with Integrated/Laptop Web Camera

--========================================================================

The external webcam I have did not work as the driver was unsupported in Windows 10. Therefore I had to fallback on to

the Integrated Laptop Camera.

Confirm that Unity has recognized the integrated camera with these steps:

1. Add the ARCamera asset to Unity as per lecture

2. Click on the ARCamera to bring up the details in the "Inspector" panel on the right of the screen

3. Click on the "Open Vuforia Configuration" button in the Inspector panel and scroll down to the "Webcam:" section

4. The "Camera Device" box should have automatically selected "Integrated Webcam"

Although I could not get this working in the first round, studying the relative position of the camera icon with respect to the cube and

the marker in the Scene helped me to get around this problem.

-----------------------------------------------------------------------------

--Positioning Target in front of the Integrated/Laptop Webcam

-----------------------------------------------------------------------------

When the cube is positioned on the target/marker in Unity, the camera icon on the scene is located on the surface of the target, but at the base of the cube.

Therefore, I had to lift my marker and tilt it towards the Integrated Webcam to create the effect of the camera sitting on top of the target just as in the Scene.

This helped the laptop camera lock on to the target and successfully render the cube on the marker.

NOTE: Having a table lamp or other lighting behind the Webcam impedes on the capability of the camera to lock on to the target! Turn off background lighting

before running the application.

Lecture 10 - [Course Update] - Answering Questions Blank White Texture and Image Database C

(Video Uploaded)

Quiz - Internet of Things Augmented Reality

**Section 4: Lab\_3 - Linking Particle Photon to Unity SDK**

Lecture 11 - Linking Particle Photon to Unity

**Section 5: Lab\_4 - AR Thirsty Plant Moisture Sensor**

Lecture 12 - Plant AR you Thirsty? - Water Level Sensor IoTAR - Visualizing Water Level (Video Uploaded)

Lecture 13 - Thirsty Plant Part 2 (Video Uploaded)

Lecture 14 - Thirsty Plant Part 3 (Video Uploaded)

**Section 6: Lab\_5 - Light Intensity**

Lecture 15 - Light controlled Campfire in Augmented Reality (Video Uploaded)

Lecture 16 - Review Lecture (Video Uploaded)

**Section 7: Lab\_6 - 3D Distance- AR Measuring Tool**

Lecture 17 - Rul-AR Augmented reality Measuring Tool (Video Uploaded)

**Section 8: Lab\_7 - HeartRate Sensor AR Bloodflow**

Lecture 18 - Augmented Reality HeartRate (Video Uploaded)

**Section 9: Lab\_8 - Heat Sensor on Cup**

Lecture 19 - Lab\_8 - Heat Sensor on Cup (Video Uploaded)

**Section 10: Lab\_9 - Measurement Force Scale**

Lecture 20 - Force Sensitive Resistor in Augmented Reality (Video Uploaded)

**Section 11: Lab\_10 - Alcohol Gas Sensor**

Lecture 21 - Alcohol Gas Sensor (Video Uploaded)

**Section 12: Lab\_11 - WeathAR - Augmented Reality Weather App**

Lecture 22 – WeathAR (Video Uploaded)

**Section 13: Demonstation Showcase Videos (Non-Tutorial Videos)**

Lecture 23 - IoT AR Sensor Dashboard (Video Uploaded)

Lecture 24 – Unreal Engine 4 Demonstation (Video Uploaded)

Lecture 25 – Recreate Unreal Engine Fight Scene

Check this link to recreate the Unreal Engine Fight Scene.

http://www.unreal4ar.com/demo-videos/

It is an Executable for Windows, Android and iOS.

Note: Because it belongs to the Unreal Engine, you will not be able to import it into Unity.

**Section 14: [Course Update] Vuforia 7 and Unity 2017.3**

Lecture 26 - [NEW] Vuforia 7/ Unity 2017.3 Download/Install and HelloWorldAR (Video Uploaded)

Lecture 27 - [NEW] Vuforia 7 Ground Plane (Video Uploaded)

Lecture 28 - [NEW] Vuforia 7 Export to Android Build in Unity 2017 (Video Uploaded)

Lecture 29 - [NEW] Vuforia 7 3D Object Scanner (Video Uploaded)

**Section 15 - Additional IoT Videos for Arduino**

Lecture 30 - Download and Install Arduino IDE (Video Uploaded)

Lecture 31 - Setting up Arduino Yun and Yun Min Wifi Web Access (Video Uploaded)

**Section 16: Conclusion & Bonus Section**

Lecture 32 – Conclusion (Video Uploaded)

Lecture 33 – Bonus Lecture (Video Uploaded)