Short introductory guide to Unity3D and MiddleVR for the AVALab HMD system

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1   Introduction

This is a short introduction to getting your project up and running with Unity3D [4] and MiddleVR [1]. This guide assumes that you are working on your project mainly on your own computer and the guide is written with the intention of testing your product in AVALab using a HMD, not for general development in AVALab.

If you wish to run the project in the Unity editor on the AVALab computer, it is assumed that you have a Unity of version 3.5. For testing of the compiled executable, you can use which-ever version of Unity (3+) you are most confident with for compilation on your own computer.

You can deploy your program and test using the HMD in two different ways:

- Copy your project to the AVALab computer, install the MiddleVR package and deploy from there.

- Install the MiddleVR package and configuration file on your own computer and test a compiled executable of your project on the AVALab computer.

NOTE: I have only tested MiddleVR on Unity 3.5, and have no idea how it works with Unity 4+, other than the assumption that it will work since Unity Technologies hasn't really changed anything in this area for their Unity 4.0 release. However, I take no responsibility for any issues or problems that may arise, should you choose to try it out.

ADDITIONAL NOTE: I would recommend anyone interested in using Unity and MiddleVR to also have a look at the MiddleVR getting started guide [2].

2   What you will need

- A copy of Unity (3.5 for editing on AVALab or whichever you prefer on your own computer for testing the final compiled project) [4]

Figure 1: The desktop icons needed for getting Unity and Optitrack up and running. From left to right: Unity in DirectX redering mode (default on Windows), Unity in OpenGL rendering mode (default on Mac), AVALab camera setup and configuration in Optitrack
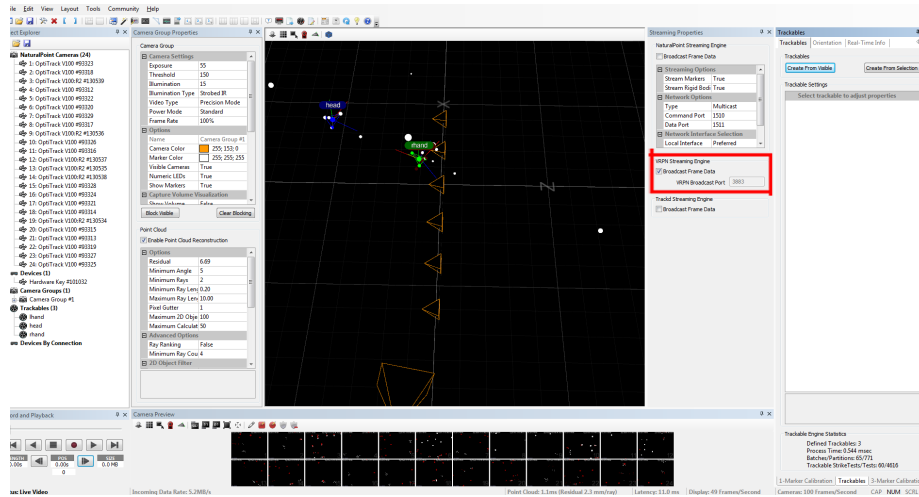

Figure 2: The Optitrack environment showing a currently running camera setup, displaying position in space of the HMD and mice. Make sure Broadcast Frame Data via VRPN is enabled (should be by default)

- The MiddleVR unitypackage to be imported into the Unity project [3]

- The MiddleVR configuration file [3]

3   Let us get started

First of, on the desktop of the AVALab computer there are a few useful shortcuts, depicted in Figure 1. The first that should be noted is "24cams.ttp - Genvej". This will start optitrack and automatically load the newest calibrated configuration for the camera setup in AVALab. It might take a few seconds to start-up and load the configuration. Optitrack loaded with the correct configurations should look something like Figure 2. Make sure that "Broadcast Frame Data" via the VRPN Streaming Engine is enabled!

The next (and final) two icons of icons of relevance are the two Unity short-cuts, one for enabling the DirectX renderer, and one for enabling OpenGL rendering. If you do not plan to write your own custom shaders or do so in HLSL or Cg, you can use DirectX (which is Unity default on Windows), or if you plan to use (or already uses) custom shaders written in GLSL, you should pick the OpenGL shortcut.

4 Getting MiddleVR into Unity

- With your current Unity project open in the Unity Editor, go to "Assets > Import Package > Costum Package..." (See Figure 3)

- Navigate the the location of the unitypackage (C:\MiddleVRFiles\MiddleVR.unitypackage on the AVALab computer or whatever folder you have downloaded it to on your own computer) and open it (See Figure 5a for AVALab location)

- Make sure you import everything from the unitypackage to your project (See Figure 4)

- To add the support for HMD to your current scene, simply drag and drop the VRManager from the newly imported folder into the scene you wish. The VRManager is located in "MiddleVR > VRManager" (See Figure 6). Upon starting the scene in play-mode, the VRManager should automatically disable existing cameras and add and enable its own HMD setup according to the config file (next bullet)

- To setup the correct config file for the HMD in AVALab, load the config file, found at "C:\MiddleVRFiles\middlevr-unity-hmd.vrx" (on the AVALab computer) or from whatever folder you have downloaded it to on your own computer, onto the VRManager GameObject (See Figure 5b for AVALab location)

- Now, there are three options for getting your game running on the AVALab computer. Choose whichever you are most comfortable with.

  1. If you are on your own computer, compile the scene to a standalone (windows) executable and bring that with you to the AVALab facilities. Play the game as normal, once you have made sure Optitract is up and running properly.

  2. Or bring the Unity project and that that up on the AVALAb computer in Unity. Play the scene, and it should work, once you have made sure Optitract is up and running properly.

  3. Start up the MiddleVR configuration program (Found in the start menu). From there you can simulate the Unity program, running it via the MiddleVRConfig program.
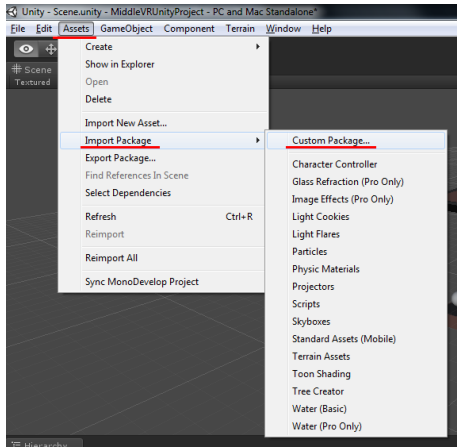
Figure 3: Illustration of the Unity path for importing custom unitypackages
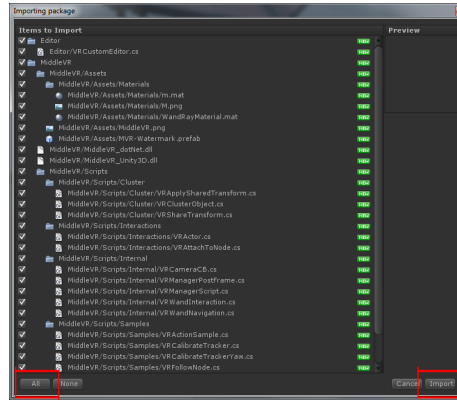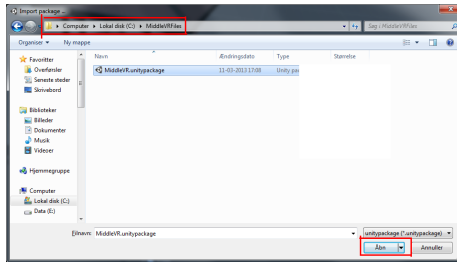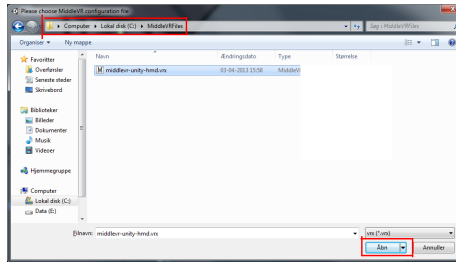

Figure 4: Illustration of the elements to be imported in Unity. Make sure it is set to import everything

(a) Unitypackage for import

(b) MiddleVR config file for setup

Figure 5: Folder destination for the MiddleVR files on the AVALab computer.

5   Trouble-shooting MiddleVR in Unity

Q:

The Unity program is running without errors, but the movement of the HMD is not detected. What gives?

A:

Make sure Optitrack is running and configured properly meaning you can see the movement in the Optitrack editor. Then make sure Optitrack is broadcasting via VRPN. Try these following steps:

1. If you cannot see movement in Optitrack, it has probably not been configured correctly. Close the running Optitrack application and restart it using the desktop shortcut "24cams.ttp - Genvej" (See Figure 1).

2. If Optitrack is running and you can see the HMD movement inside

Optitrack, make sure that VRPN broadcasting is enabled (See Figure 2).

3. When made sure Optitrack is running and streaming via VRPN, make sure that the VRManager in Unity is setup with the correct config file for AVALab. The config file is found at "C:\MiddleVRFiles\middlevr-unity-hmd.vrx" (See Figure 5b)

References

[1] I'm in vr - middlevr. http://www.imin-vr.com/middlevr/. Accessed: 2013-04-11.

[2] Middlevr user guide. http://www.imin-vr.com/doc/1.2/. Accessed: 2013-04-11.

[3] Nothing here yet. http://www.create.aau.dk/facilities/audio-visual-arena-ava/. Accessed: 2013-04-12.

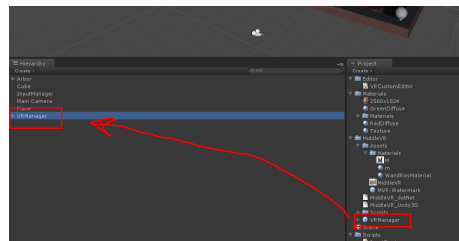[4] Unity - game engine. http://www.unity3d.com/. Accessed: 2013-04-11.

Figure 6: Simply drag and drop the VRManager into the relevant scene for enabling of the MiddleVR system