Moving in a Virtual Space

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Overview:

In this tutorial, I will explain how to make a 3D environment in Unity work with an Oculus Rift headset and touch controllers. This includes motion tracking for both the headset and touch controllers, as well as movement around a virtual space and interacting with objects within that space.

This tutorial is written under the assumption that you already have an environment built within the Unity engine. You may use either a Windows or Mac operating system when building your environment, but it will need to be moved to a Windows computer to work with an Oculus Rift. You do not need to be on a Windows computer to follow these steps, but it is highly recommended as you cannot play test through the headset when using anything else.

Make sure that your computer has Unity version 5.1 or later in order to use VR. Also insure that you have the packages *Oculus Utilities for Unity, Oculus Avatar SDK,* and *Oculus Platform SDK* downloaded to your computer from the Oculus site. If not, they can be downloaded for free at https://developer.oculus.com/downloads/unity/

The Process:

First, you need to configure Unity to support VR. To do this, go to Edit > Project Setting > Player > Other Settings > Reading. Then, in the inspector, enable the check-box next to "Virtual Reality Inspector."

Now you need to Import your 3 packages mentioned earlier. Once done, under your assets folder, navigate to your prefabs within the OVR folder. There, you should find a prefab labeled OVRPlayerController. Drag and drop that into your workspace. This will serve as your camera and is tracked by the Oculus headset. Click the play button to see through the headset.

Next, you need to enable motion tracking for the touch controllers. A model of the controller can be located within the OVR folder. Find that and drag it into the OVRPlayerController and parent it under the LeftHandAnchor empty object. Do the same for the RightHandAnchor. Select each model and set their x, y, and z positions to 0.

Under your assets folder, create a new script and name it "Touch Controllers." Open that script and match it to the script bellow.

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class TouchcController : MonoBehaviour {

        public OVRInput.Controller Controller;


        // Update is called once per frame
        void Update () {
                transform.localPosition = OVRInput.GetLocalControllerPosition(Controller);
                transform.localRotation = OVRInput.GetLocalControllerRotation(Controller);
        }
}
```

Save that and go back into Unity. Now you need to drag that script to both of your controller models. In the inspector for both models, find Touch Controller (Script). In that box, set Controller to R Touch and L Touch for the left and right controllers. That should allow you to see and track your controllers when you press the play button. This should also allow you to move using the analog sticks on the controllers. If not, see "Troubleshooting."

Finally, we want to allow the player to interact with objects within the environment. (If you are using multiple models to create a single object, be sure that each model is parented under an empty object.)

First, select both LeftHandAnchor and RightHandAnchor. Click it again and this time select Sphere Collider. Enable the "Is Trigger" option and set "Radius" to 0.05.

Next, you need to select LeftHandAnchor, then click and drag it into "Grip Transform" under OVR Grabber (Script) in the inspector. Set the "Grab Volumes" size to 1. Drag the same object to "Element 0." Set "Controller" to "L Touch." Repeat this for RightHandAnchor. Select both objects and under, "Rigid Body," disable, "Use Gravity."

Now, for each of your objects, go to their inspectors and add OVRGrabbable. If the object is a parent of multiple models, then in the inspector under OVR Grabbable (Script), set the number of "Grab Points" equal to the number of parented objects, or models. Then, click and drag each object to the boxes that appear.

Press the play button and you should be able to approach your objects and interact with them by squeezing the grips on the touch controllers.

Troubleshooting:

Controller Objects floating across the room:

Make sure they are parented correctly under your OVRPlayerController. Also check and make sure your Touch Controller (Script) is attached to the correct object or parent. Also ensure that, when parented, their positions are set to 0.

Character is not moving when using the analog sticks, but still responds to the WASD keys:

Delete the controller object and replace it. Also re-attach the script. You may also try exporting the game, as some problems may only show up within Unity, while not in the finished game.

Game object is non-responsive:

Delete the object and replace it. Also re-attach the script. You may also try exporting the game. Some problems may show up within Unity, while not in the finished game.

Endnotes:

This information was obtained through various internet searches, tutorial videos, the Unity and Oculus web pages, as well as my own experience working with Unity. The Unity site is full of great, more in-depth tutorials. You can also find many, more digestible, tutorials on YouTube. Do your own research and see what kinds of creative things you can make!