RUIS for Unity 1.07

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For updates and other information, see http://ruisystem.net/

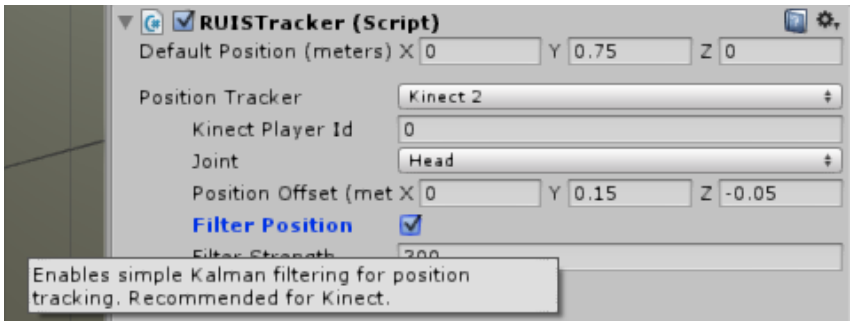
Introduction

RUIS (Reality-based User Interface System) gives hobbyists and seasoned developers an easy access to the state-of-the-art interaction devices, so they can bring their innovations into the field of virtual reality and motion controlled applications. Currently RUIS for Unity includes a versatile **display manager** for handling several display devices, and supports the use of **Kinect 1, Kinect 2, Oculus Rift DK2,** and **PlayStation Move** together **in the same coordinate system**. This means that avatars controlled by Kinect can interact with PS Move controlled objects; A player represented by a Kinect-controlled avatar can grab a PS Move controller that is rendered as a tool within the application for example.

Quickstart

Try example scenes at \RUISunity\Assets\RUIS\Examples\ -directory. You can develop and test your own motion controlled applications even if you have only a mouse and keyboard, because in RUIS they can emulate 3D input devices. If you want to use Oculus Rift DK2 together with Kinect 1 or 2, open the OculusRiftExample scene and read the "*Using multiple motion trackers with a common coordinate systems*" section of this document.

Most RUIS scripts have extensive tooltip information, so hover the mouse cursor over any variables of RUIS components in Unity Editor's Inspector tab to learn about RUIS.



Requirements

Device	Windows	OSX	Unity Pro Only	Additional details
Oculus Rift	X	X		DK1 and DK2 supported. Oculus Runtime 0.4.4 required.
Kinect 1	X			Win32-bit version of OpenNI 1.5.4.0 required.
Kinect 2	X		X	Windows 8.1 only. Windows Kinect SDK 2.0 October 2014 release (2.0.1410) required.
PS Move	X	X		PS3, PS Eye, and Move.me software required.
Razer Hydra	X	X	X	

Known issues

- **Oculus Rift: Unity Free users need to import *OculusUnityIntegration.unitypackage* version 0.4.4 and overwrite existing files if they get DllNotFoundException with *oculusplugin.dll*.**
- **Oculus Rift: Use DX11 mode and "Direct HMD Access" in Windows standalone builds, as it suffers from less judder than DX9 and "Extend Desktop to the HMD".**
- **Oculus Rift: Multi-display setups don't work if one of the displays is toggled with "Enable Oculus Rift". This will be fixed when the future Oculus SDKs allow it.**
- **Oculus Rift together with Razer Hydra won't let you see the 2D GUI calibration instructions upon loading a scene: 1. Point the left controller towards the base station and then press the shoulder button. 2. Do the same with right controller.**
- **Shadows can sometimes disappear on displays with 'Head Tracked CAVE Display' option enabled. This is an Unity bug related to custom projection matrices.**

Installation

RUIS for Unity requires Unity 4 (both Windows and OSX are supported). It has been tested with **version 4.6.1**.

Optional drivers and software

- Kinect 1 and PrimeSense sensors are supported only via OpenNI software
- Kinect 2 is supported via Kinect for Windows SDK 2.0 (*Windows 8 only*)
- Oculus Rift is supported via Oculus Runtime for Windows / Mac OS (v0.4.4 Beta)
- PS Move controllers are supported via Move.me software for PlayStation 3

Installing Oculus Rift

Go to Oculus VR Developer Center, download Oculus SDK v0.4.4 Beta (Windows or OSX Runtime) and install it.

Installing Kinect 2

Go to Kinect for Windows website, download Kinect for Windows SDK 2.0 and install it. We have tested that RUIS works at least with October 2014 release (2.0.1410).

Installing OpenNI for Kinect 1 / ASUS Xtion / PrimeSense Sensor

You only need to follow through this section if you plan to use Kinect 1 with RUIS on your computer, otherwise you can skip this section. RUIS for Unity takes advantage of "OpenNI Unity Toolkit" that requires **Win32-bit version of OpenNI** 1.5.4.0 (OpenNI 2.0 is not yet supported though). **If you have Windows 8 or "Kinect for Windows"** you should also read the Troubleshooting section in the end of this readme.

You need to install OpenNI and NITE middleware before using Kinect 1 in RUIS. Check your installation validity by running the NiSimpleViewer example application at \OpenNI\Samples\Bin\Release\ directory. If it shows depth image from Kinect 1, you have successfully installed OpenNI.

Kinect 1 and Windows 7 / Vista / XP

Before installing Kinect 1, make sure that you have uninstalled all existing OpenNI, NITE, Primesense, and SensorKinect instances from Control Panel's "Uninstall a program" section, and reboot your computer. Download the following OpenNI installation file package:
https://drive.google.com/file/d/0B0dcx4DSNNn0WVFwVExDRnBBUkk/edit?usp=sharing

Unzip the downloaded package, and install its files in the following order (If the download link was dead, you need to google for the below files):

1. OpenNI-Win32-1.5.4.0-Dev1.zip
2. NITE-Win32-1.5.2.21-Dev.zip
3. SensorKinect093-Bin-Win32-v5.1.2.1.msi
4. Sensor-Win32-5.1.2.1-Redist.zip

Kinect 1 and Windows 8

Using the same files as for Windows 7, follow this procedure to install drivers for Kinect 1:

1. Uninstall any existing OpenNi, Nite, and the Kinect 1 drivers.
2. Windows key + R to open the run prompt
3. shutdown.exe /r /o /f /t 00
4. Select Troubleshoot
5. Select Advanced
6. Select Windows startup and then restart
7. Enter the option for Disable Driver Signature
8. Reinstall OpenNi (32-bit version), Nite, and the Kinect 1 driver.

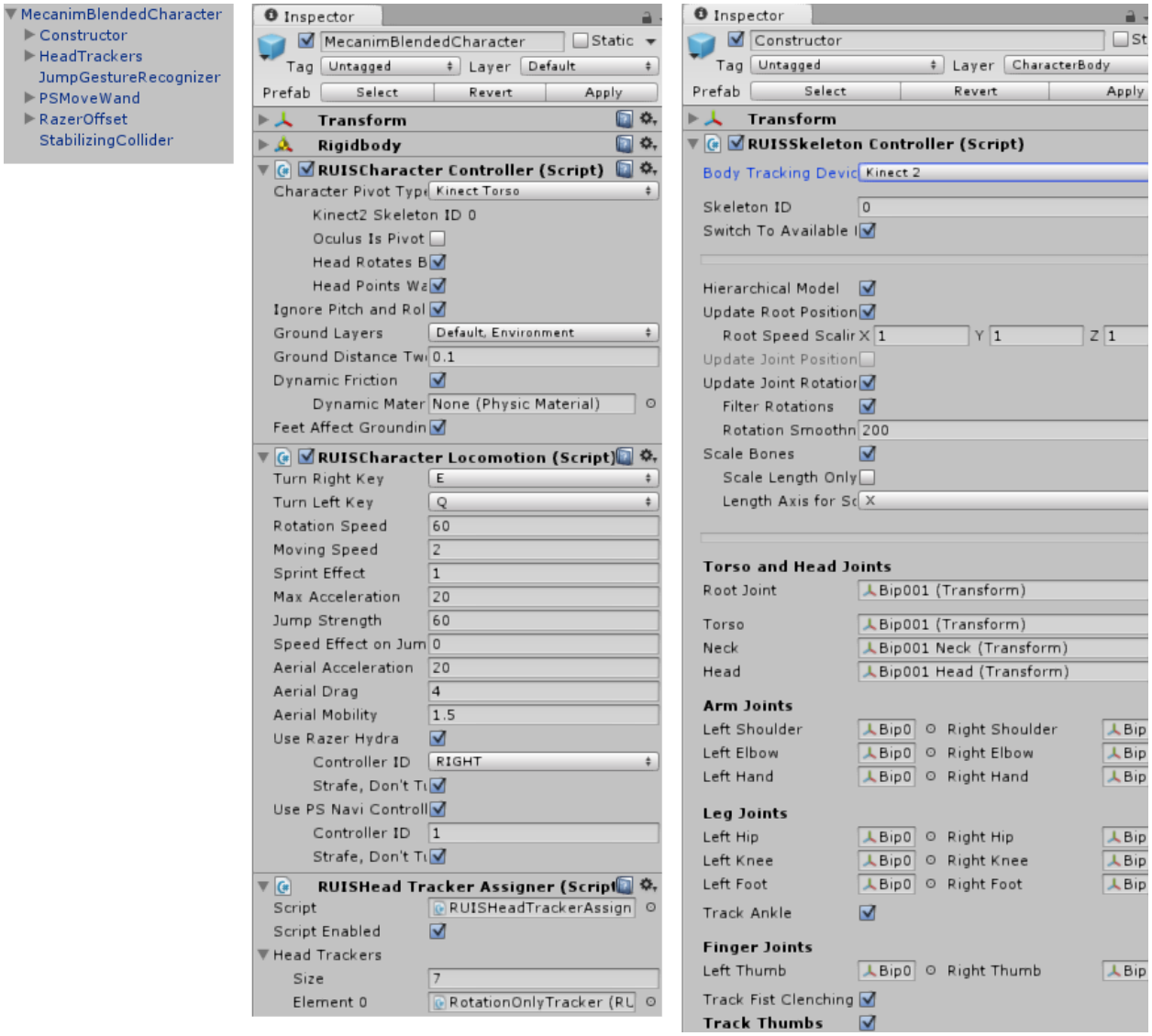
Kinect 1 and OSX

Kinect 1 for OSX is not supported at the moment. RUIS uses "OpenNI Unity Toolkit" that supports Win32-bit version of OpenNI only.

Oculus Rift with Kinect, PS Move, and Razer Hydra

RUIS features *MecanimBlendedCharacter* prefab, which is a feature-rich character controller for applications with first- or third-person view. This prefab's scripts automatically use Oculus Rift orientation tracking and combine that with positional head tracking from either DK2 camera, Kinect, PS Move, or Razer Hydra. The tracking device is decided at runtime depending on which devices are enabled in RUIS' InputManager.

The *MecanimBlendedCharacter* prefab contains a human 3D model that is animated with Kinect 1 or Kinect 2. You can substitute the default model with your own. Mecanim walking animation overtakes pose input from Kinect whenever the player is moving the character either with keyboard, gamepad, PS Move Navigation controller, or Razer Hydra controller. You can **use your own Mecanim animation graph** and use RUIS features to write a script that **blends Mecanim animation with Kinect pose data in real-time**. See KinectTwoPlayers or OculusRiftExample at \RUISunity\Assets\RUIS\Examples\ and modify the *MecanimBlendedCharacter* gameobjects to get started. When importing *MecanimBlendedCharacter prefab* to a new Oculus Rift scene, you need to toggle the "Enable Oculus Rift" option from the RUISDisplay component that is found in the following gameobject: *RUIS → DisplayManager → Main Display* (name of your display).



You can make a third-person application with *MecanimBlendedCharacter* if you remove its *RUISHeadTrackerAssigner* component and the *HeadTrackers* gameobject parented under it, and create a new RUISCamera that follows the *MecanimBlendedCharacter*. A more simplified version of *MecanimBlendedCharacter* is *ControllableCharacter* prefab, that is animated by Kinect and has the same features but does not include components for blending Mecanim animation.

By default the *MecanimBlendedCharacter* is affected by gravity, so you should place it on a static Collider. It has *PSMoveWand* and *RazerOffset* child gameobjects that each contain a 3D Wand that can grab and manipulate objects, when the corresponding devices are enabled. You can delete or modify those objects. The *JumpGestureRecognizer* child gameobject contains scripts that make the character jump if Kinect is enabled and detects the player jumping. The recognition is far from perfect however, and you can disable the *JumpGestureRecognizer* if you like.

The *MecanimBlendedCharacter* prefab uses the Constructor character 3D model provided by Unity. **You can replace the prefab's 3D model with your own avatar model.** In that case you need to relink the Joint Transforms in the RUISSkeletonController component (see the right side of the above image), found in the *Constructor* gameobject. If your avatar's rig has vertices attached to the root Transform, then link that Transform both to "Root Joint" and "Torso" in RUISSkeletonController. If you use Kinect 2 and have "Track Fist Clenching" enabled, you should make sure that your avatar rig's finger joints all include the substring "finger" or "Finger" in their name. If you don't use Kinect to animate your character, then you might also need to adjust the Y-coordinate of the *StabilizingCollider* gameobject's Transform.

Only Oculus Rift

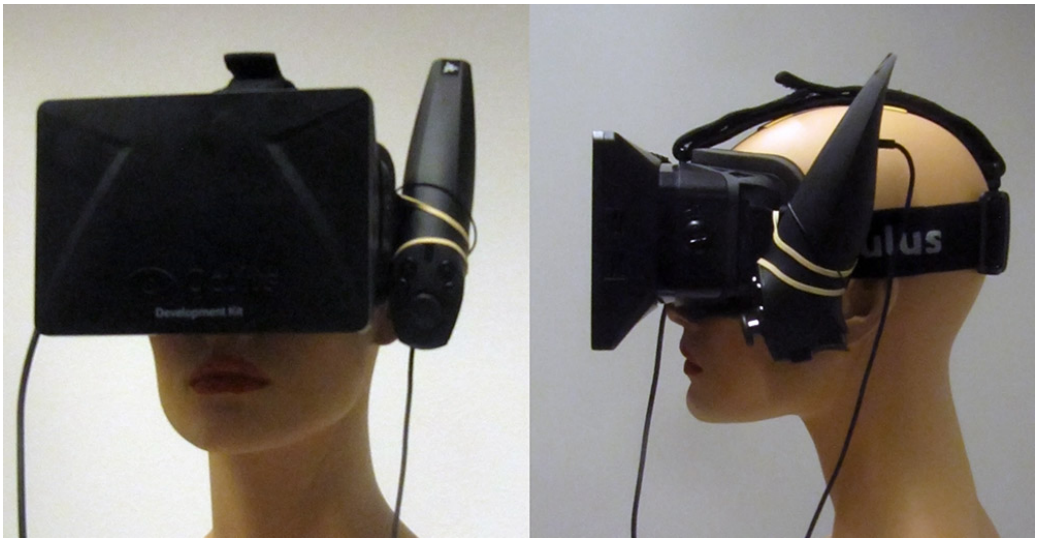
Use mouse and keyboard for controlling the *MecanimBlendedCharacter*. See *Avatar Controls* section below. If you are not using other tracking devices besides DK2 camera, then the avatar position follows the Rift's location, in which case you should do the following: find the *InputManager* gameobject that is parented under *RUIS* gameobject, change the "Master Coordinate System Sensor" to Oculus_DK2 and adjust the "Location Offset" so that the viewpoint is roughly on the eye level of the avatar when you run the application (around [0, 0.8, 0] is about right, depending on your Oculus camera position). **Experiment with different combinations of "Head Rotates Body" and "Head Rotates Walking Direction" parameters** toggled on and off in RUISCharacterController component, to see which Oculus Rift control schemes are available to you.

Oculus Rift + Kinect 1 or 2

Place the Kinect so that it can see you and the floor. The avatar's pose and limbs' length is tracked by Kinect. With Kinect 1 you need to stand in front of the Kinect during gameplay while wearing the Oculus Rift, while Kinect 2 can also track you while you are sitting on a chair. You might need a long display cable and an USB extension cord. Some people have gone wireless with the Rift using Asus Wavi and a custom battery pack. We recommend that you use a wireless gamepad to control the *MecanimBlendedCharacter* locomotion. **If you are using DK2 with Kinect, then you need to calibrate their coordinate systems** by displaying the RUIS menu (ESC) in run-time, selecting "Kinect - Oculus DK2" from the Device Calibration drop-down menu, and clicking the "Calibrate Device(s)" -button.

Oculus Rift + Razer Hydra

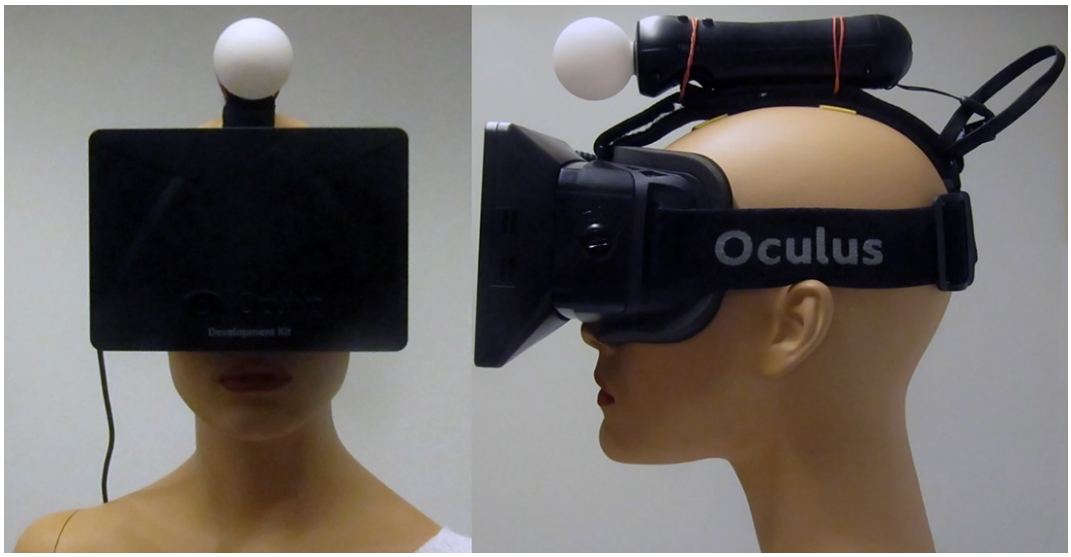
Place the Razer Hydra **base station on your desk** so that its cable ports are facing away from you, like you would do with any Razer Hydra game. One controller (RIGHT) will be wielded normally in your hand and is used for avatar locomotion, grabbing objects, etc., while the other (LEFT) needs to be attached on the **left side of your head** for head tracking:



You can use e.g. a rubber band to tie the Razer onto the Rift's strap. When the scene starts, it asks you to point the LEFT controller (on the head) towards the Razer Hydra base station and to press the trigger button. Same is repeated for the hand-held RIGHT controller.

Oculus Rift + PlayStation Move

Attach the PS Move controller designated as GEM[0] in Move.me software on the topmost strap of Oculus Rift (two rubber bands work well):



The strap and the rubber bands should be kept tight to minimize any controller wobble when you move your head. The Move button should be pointing up towards the ceiling when you're standing straight. PS Move GEM[1] acts as a 3D Wand that can grab and manipulate objects. If you want to use PS Navigation controller to make the *MecanimBlendedCharacter* walk, run, and jump, then be sure that the "Controller ID" in RUISCharacterLocomotion component of *MecanimBlendedCharacter* corresponds to the ID that can be seen in the Controller Settings of PlayStation. You can access those settings if you press and hold the PS Navigation controller's PlayStation button.

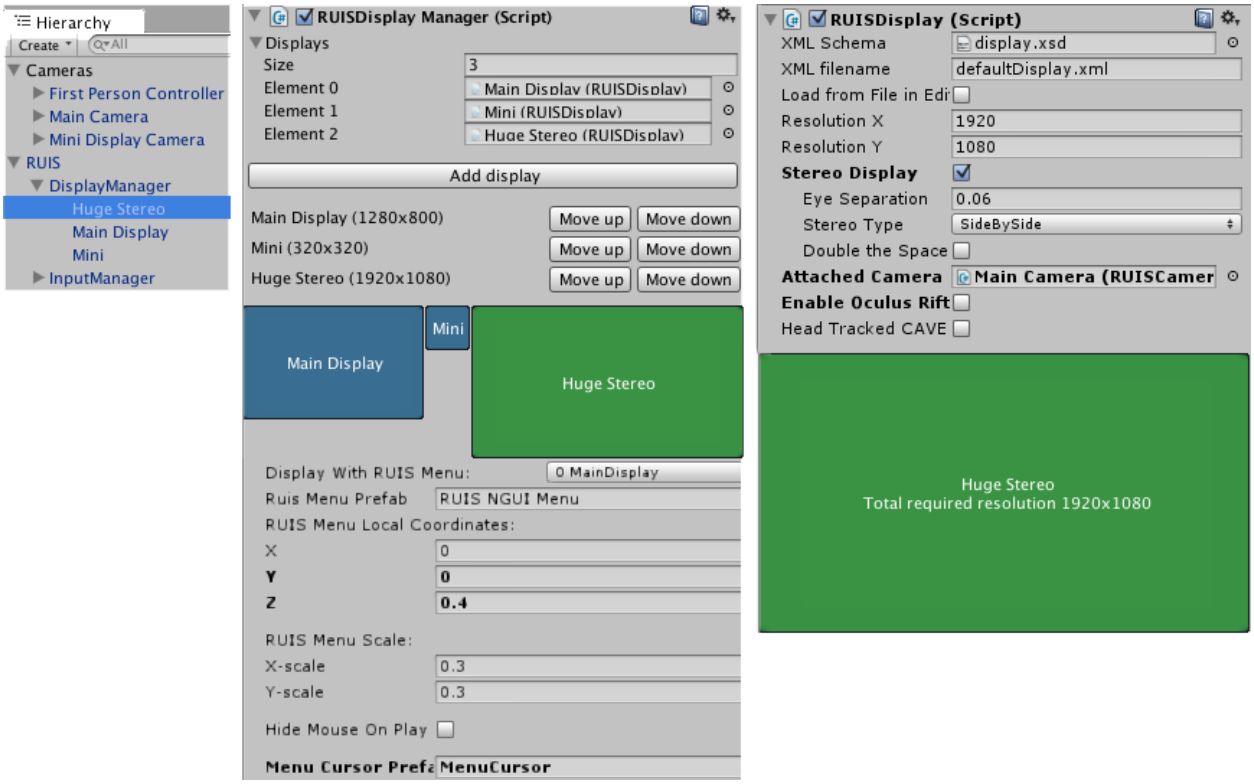
If both PS Move and Kinect are enabled, then you need to calibrate their coordinate systems by displaying the RUIS menu (ESC) in run-time, selecting “Kinect - PS Move” from the Device Calibration drop-down menu, and clicking the “Calibrate Device(s)” -button (see *Example: Kinect and PS Move calibration* section for details).

If PS Move is enabled and Kinect is disabled, you may need to edit y-value of *translate* element in the file ‘calibration.xml’ for the head position to appear at correct altitude.

Display Manager

You can have your Unity application render 3D graphics on **any number of mono and stereo displays** when you use RUIS and run your application in windowed mode. You need to have your displays arranged sideways in your operating system’s display settings, because RUIS automatically creates a game window where all the viewports are side-by-side. **When you intend to use multiple displays, disable “D3D11 Force Exclusive Mode” from Unity’s Standalone Player Options**, because currently that setting forces your standalone application into fullscreen mode. Furthermore, the setting gets re-enabled after each build for some reason.

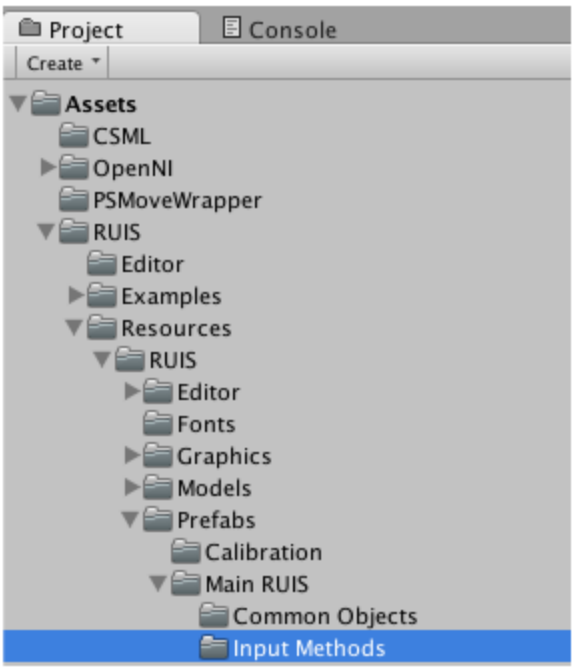
For 3D displays, side-by-side and top-and-bottom modes are supported. RUIS display configuration can be edited through the *DisplayManager* gameobject that is parented under *RUIS* gameobject. The RUISDisplayManager script shows an overview of your current display setup, whose individual displays are parented under the *DisplayManager* gameobject. When adding new displays in RUIS, keep in mind that **each *RUISDisplay* needs to have a *RUISCamera* gameobject attached to it** so that something will rendered on those displays. If you toggle the “Enable Oculus Rift” option from your RUISDisplay, then the “Attached Camera” will act as an orientation tracked Oculus Rift camera. In order to learn RUIS’ display manager capabilities, see DisplayManagerExample at \RUISunity\Assets\RUIS\Examples\



Other Features

3D user interface prefabs for selection and manipulation

RUIS for Unity can be used to easily create a custom 3D user interfaces with custom selection and manipulation schemes by the use of so called Wand prefabs. Currently supported wands (input devices) are: **MouseWand**, **PSMoveWand**, **RazerHydraWand**, and **SkeletonWand** (Kinect). These prefabs are found at \RUISunity\Assets\RUIS\Resources\RUIS\Prefabs\Main RUIS\Input Methods\. To see how to use these prefabs, check out BowlingAlley (*PSMoveWand*), MinimalScene (*MouseWand*), and OculusRiftExample (SkeletonWand) at \RUISunity\Assets\RUIS\Examples\ . SkeletonWand is different from the other Wands because selection events are not activated via buttons, but using gestures. Currently the only **available selection gestures are *hold* and *fist* gestures** (latter is just for Kinect 2). Selection with the hold gesture works by holding the SkeletonWand (your hand) still for 2 seconds while pointing at the object to be selected. Release (deselect) works the same way. The fist gesture works if infrared features of Kinect 2 work properly, and this depends on your GPU drivers. You can test that by running the Kinect 2 Infrared Basics demo from SDK Browser v2.0, which should display an infrared image. For Nvidia GPUs, we have tested that the infrared features of Kinect 2 work at least with GeForce 340.52 drivers.

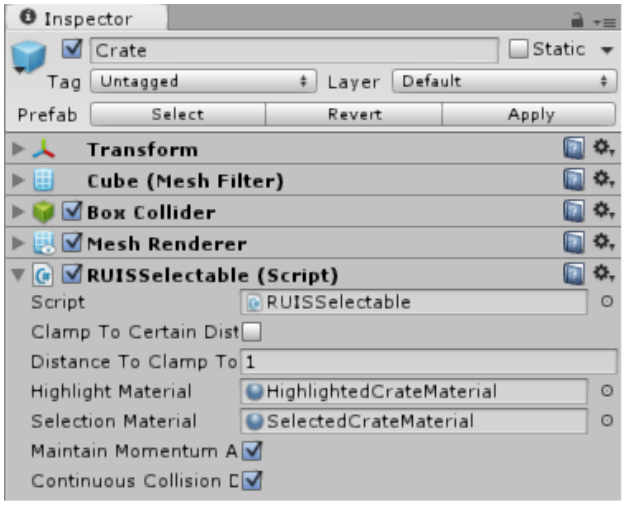


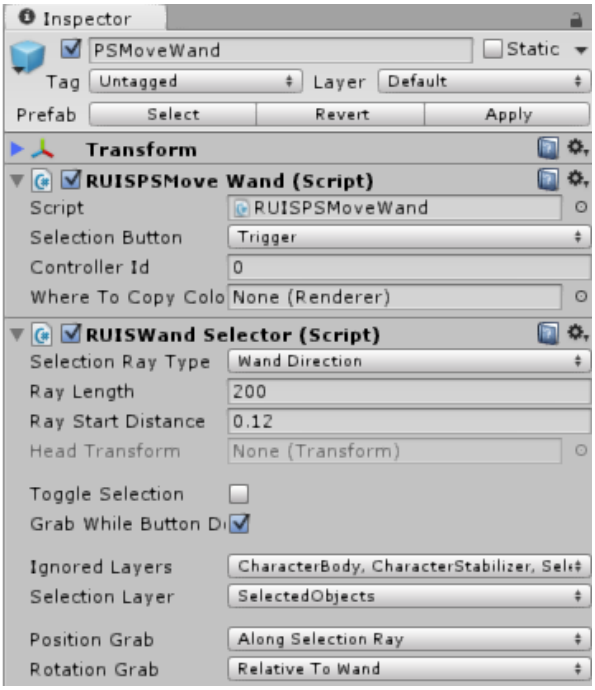
If you do not have Kinect, Razer Hydra, or PS Move, then use MouseWand prefab that relies on 2D mouse for object manipulation purposes. When your scene is playing, the above mentioned Wands are used to manipulate gameobjects that have a **RUISSelectable** script, Mesh Renderer, Rigidbody, and Collider components. See the *Crate* gameobjects in any of our example scenes. The selection ray of a Wand is checked against the Collider components (you can have several of them in a hierarchy under one object) of a gameobject to see whether it can be selected (triggered with a button or a gesture in case of Kinect) and manipulated by the Wand.

In RUIS for Unity the **3D coordinate system unit is meters**, which is reflected in the position values of the Wands, Kinect-controlled avatars, and gameobjets with RUISTracker component. You can **translate, rotate, and scale the coordinate systems** of Wands by parenting them under an empty gameobject and applying the transformations on it.

Please note that in many 3D user interfaces it makes sense to disable gravity and other physical effects of the manipulated objects; For example, in a CAD interface you don't want geometric shapes to fall down after moving them.

In the below figure's RUISPSMoveWand component, "Controller Id 0" corresponds to controller referred as GEM[0] in the Move.me screen. The "Selection Layer" is the Layer onto which the selected object will be transferred for the duration of the selection. **You can alter the object manipulation scheme** by changing the "Position Grab" and "Rotation Grab" options.

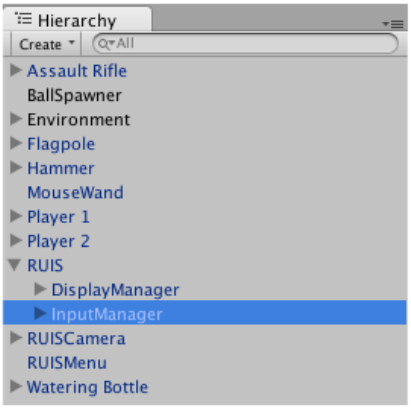


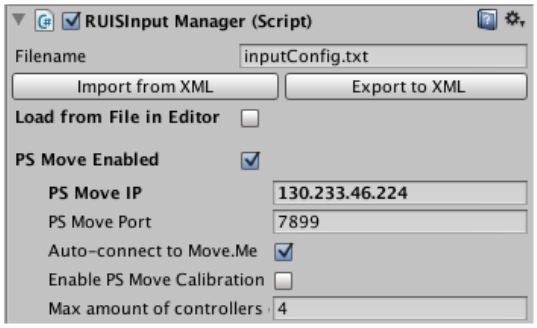


PlayStation Move controllers

If you have Move.me software for PlayStation 3 and want to use PS Move controllers in your RUIS for Unity scenes, tick the “PS Move Enabled” option in *InputManager* gameobject (parented under *RUIS* gameobject). Otherwise keep that option unchecked, because the scene will be frozen for a long time when entering playmode if RUIS is trying to connect to a Move.me server that is not available.

Be sure to set the IP address and port parameters of *InputManager* to correspond to the ones that Move.me software is displaying. When building your application with PS Move controller support, **remember to allow the executable file through your firewall** (both UDP and TCP) so that it can connect with Move.me server. Please note that pressing SELECT button will turn off the PS Move controller’s light and that controller is not tracked anymore. This is a feature of Move.me software.





Kinect controlled full-body avatars

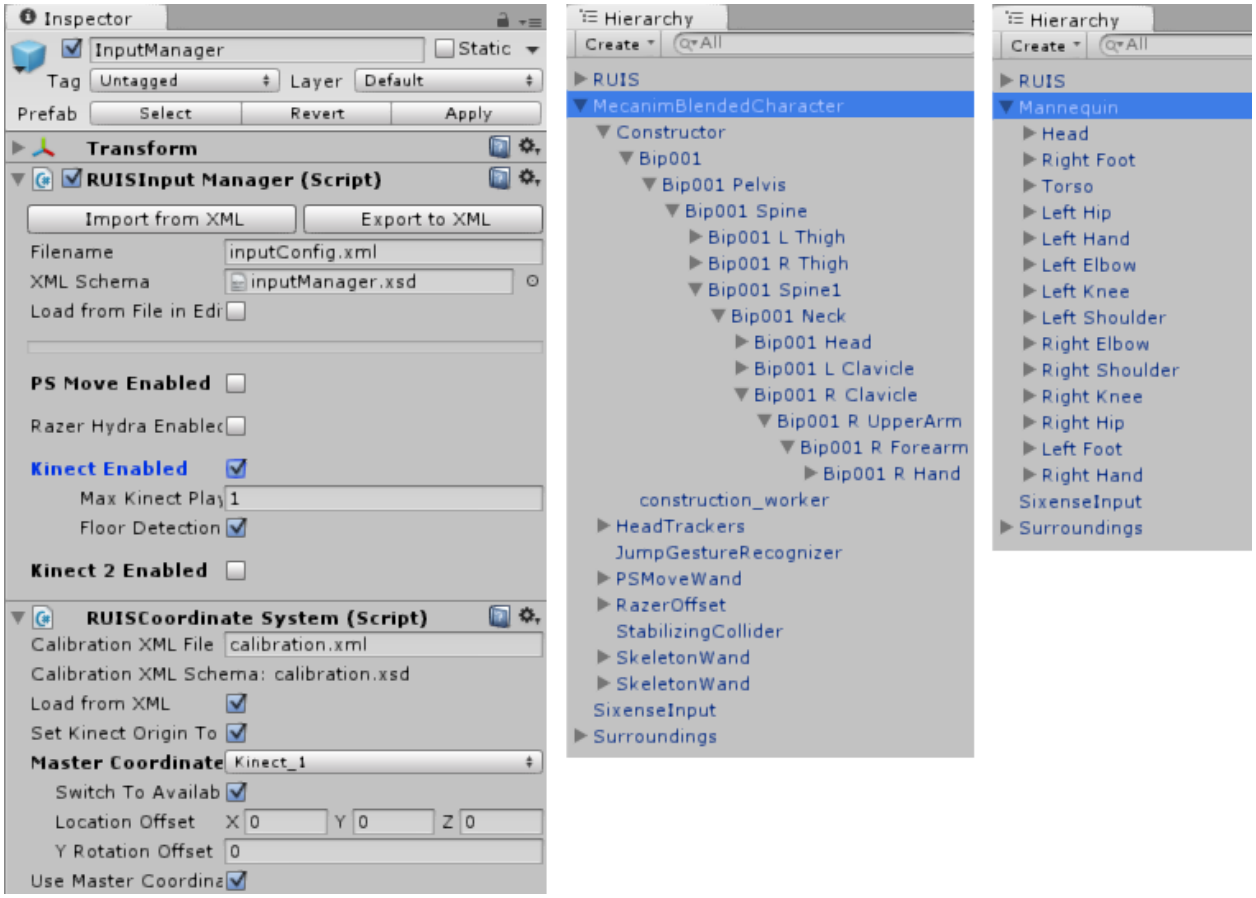
If you have successfully installed the drivers for Kinect 1 or 2 and want to use it in your RUIS for Unity scene, make sure to tick the “Kinect Enabled” / “Kinect 2 Enabled” option in *InputManager* gameobject (parented under *RUIS* gameobject). To get started, use the *ConstructorSkeleton, Mannequin, or MecanimBlendedCharacter* prefabs that are located in \RUISunity\Assets\RUIS\Resources\RUIS\Prefabs\Main RUIS\Common Objects\ . **You can replace the prefabs’ 3D models with your own.** Please note that you can use rigged models with either a hierarchical bone setup (e.g. *ConstructorSkeleton*) or a flat, one-level deep bone setup (e.g. *Mannequin*). For latter ones, you need to uncheck the “Hierarchical Model” option in the RUISSkeletonController script.

You can **translate, rotate, and scale your Kinect-controlled avatars** by parenting them under an empty gameobject and applying the transformations on it.

If you have “Floor Detection On Scene Start” enabled in RUISInputManager, or if you have calibrated Kinect using RUIS, you can take advantage of the following useful features:

1. **Set Kinect Origin To Floor** -feature can be turned on from the *InputManager* gameobject. With this option enabled the Kinect-controlled avatars will always have their feet on the XZ-plane (provided that the avatar gameobjects have model-dependent, correct Y-offsets), no matter what height your Kinect is placed on.

2. **You can tilt your Kinect downwards**, and RUIS will use a corrected coordinate system where the XZ-plane is aligned along the floor, preventing Kinect avatars from being skewed in Unity.



Using multiple motion trackers with a common coordinate system

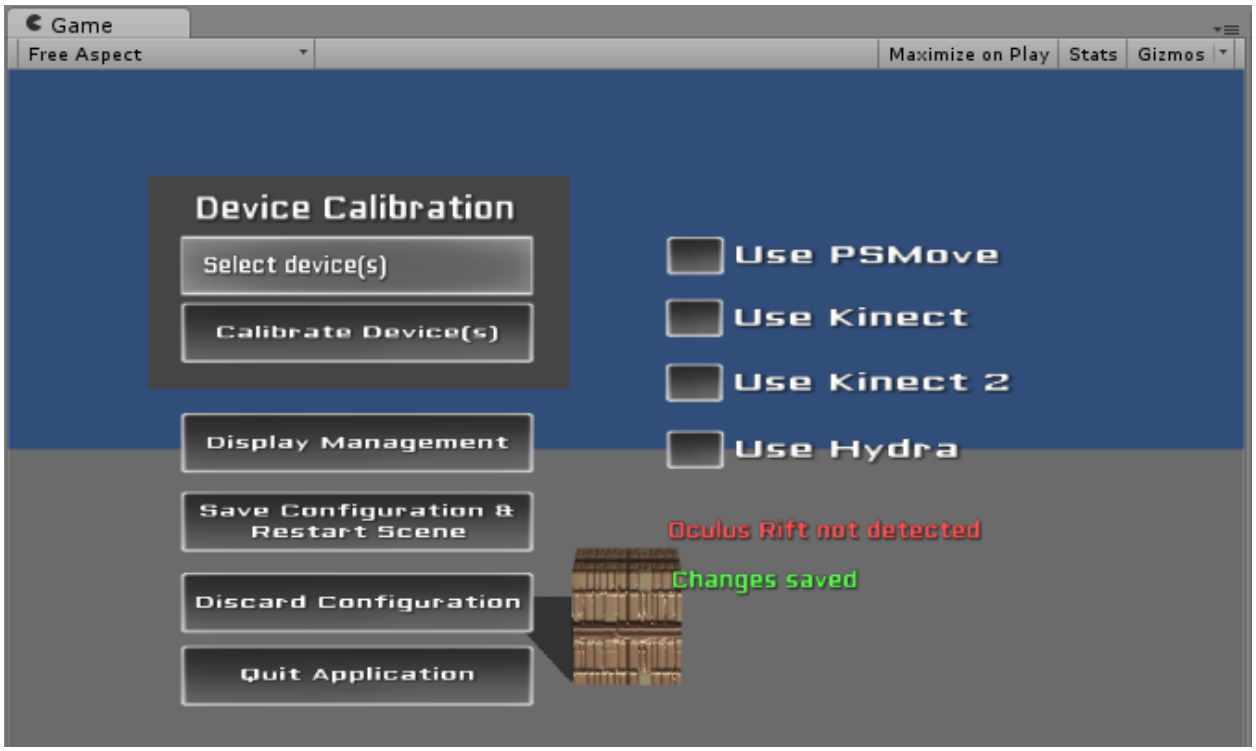
If you have multiple motion tracking devices that you want use simultaneously with a shared coordinate system, then **choose one of the devices as the "Master Coordinate System Sensor" and enable the "Use Master Coordinate System" toggle** from the RUISCoordinateSystem component (see above image). The RUISCoordinateSystem component is located in the *InputManager* gameobject, which is parented under *RUIS* gameobject. Lets say that you chose *Kinect_2* as the "Master Coordinate System Sensor", and you want to use it together with Oculus Rift DK2 and PS Move. Then you would need to calibrate two device pairs: Kinect_2–Oculus_DK2 and Kinect_2–PS_Move. The following section will tell you how to do that.

Calibrating two different motion trackers to use the same coordinate system

Calibration is needed for using two different motion trackers (e.g. **Kinect and PS Move controllers**) together **in the same coordinate system**, and also for aligning Kinect 1 or Kinect 2 coordinate system with the room floor. Calibration needs to be performed only once, but you have to do it again if you move either one of the calibrated devices. Results of the calibration (a 3x3 transformation matrix and a translation vector) are printed in Unity's output log and are also saved in an XML-file at \RUISunity\calibration.xml.

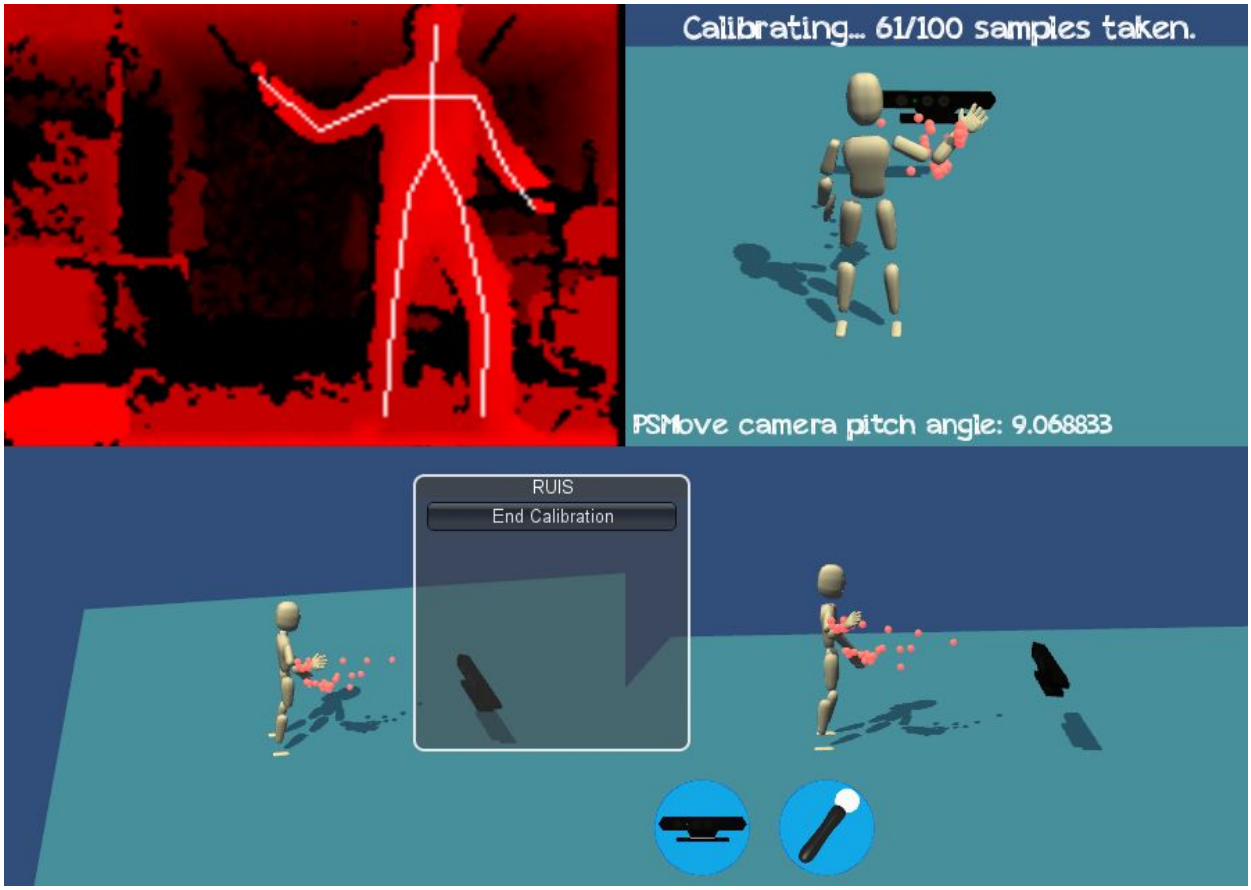
If you are using Oculus Rift and launched your standalone application with [...]_DirectToRift.exe, it will crash if you enter the Calibration scene. **Always perform calibration with the main executable [...].exe**.

You can calibrate devices by running any of our example scenes in Unity Editor, pressing ESC key to display RUIS menu, enabling those devices whose drivers you have successfully installed, selecting the device(s) that you want to calibrate (e.g. “Kinect - PS Move”) from the Device Calibration drop-down menu, and clicking the “Calibrate Device(s)” -button. This will start the interactive calibration process by loading \RUISunity\Assets\RUIS\Scenes\calibration.unity, which we will next describe in more detail for Kinect and PS Move.



Example: Kinect and PS Move calibration

Once the calibration scene has loaded, hold PS Move in your right hand, and step in the front of the Kinect. The interactive calibration process instructs you to press the X-button of PS Move to start the calibration. During the calibration process, keep the PS Move in your right hand and move it slowly so that both the Kinect and PS Eye camera clearly see it.



After the calibration is complete, you will see the results. For an example of how to use Kinect and PS Move together, please see the BowlingAlley or OculusRiftExample at \RUISunity\Assets\RUIS\Examples\

If you are holding a PS Move controller in your hand, the Kinect-controlled avatar's hand and the PS Move's virtual representation do not alway appear exactly in the same position because no calibration gives perfect results and Kinect is less accurate than PS Move. Snapping of hand locations to handheld PS Move locations might be added in a future release of RUIS for Unity.

When you are calibrating Kinect 1 or 2 (just themselves or with other devices), **it is important that Kinect sees the floor properly** (see the red Kinect depth view in the above screenshot for an example), so that the Kinect can detect its distance from the floor and its orientation with regards to the floor. That data is used to align the Kinect coordinate system's XZ-plane with floor plane.

NOTE:
Before calibrating PS Move with any other devices, you should keep thrusting your PS Move controller towards and away from your PS Eye camera, until the “PS Eye pitch angle” in the RUIS calibration scene’s viewport converges within 0.1 degree. This is because PS Eye needs to see PS Move controller moving for awhile before Move.me software can reliably estimate the pitch orientation of PS Eye. When you calibrate after the pitch angle has converged, this ensures that the saved coordinate system calibration between Kinect and PS Move will be as accurate as it can be even after restarting your computer and PlayStation. Please note that Move.me running on PlayStation does not save the pitch angle, and after restarting it, the pitch angle converges again slowly while you are using the PS Move controller in front of the PS Eye camera. To get the best possible initial pitch angle, align the PS Move controller along the PS Eye camera’s viewing axis when pressing the Move button to “light up” the controller in Move.me.

Example scenes

Examples of using RUIS for Unity can be found at \RUISunity\Assets\RUIS\Examples\
Following two points are important in BowlingAlley, KinectTwoPlayers, and OculusRiftExample scenes:

1. Choose the *InputManager* gameobject (parented under *RUIS* gameobject) and **enable those input devices that you have connected to the computer**. Oculus Rift (DK1 & 2) is automatically detected and you don’t need to enable that.

2. If you have two or more input devices, select one of them as the “Master Coordinate System Sensor” from RUISCoordinateSystem component, start the scene, press ESC to open the RUIS menu, choose one of the device pairs from “Device Calibration”, and click “Calibrate Device(s)”. After the calibration is completed, repeat the process for the remaining device pairs that contain the “Master Coordinate System Sensor” (you can skip “Kinect floor data” calibration for Kinect 1 and 2).

OculusRiftExample

This example presents *MecanimBlendedCharacter* gameobject, which is a versatile beast. Kinect, Kinect 2, Razer Hydra, and PS Move can be used in positional head tracking for Oculus Rift DK1 if you don’t have DK2. When the scene is running, you can control the constructor character with keyboard, gamepad, PS Move Navigation controller, or Razer Hydra controller.

MinimalScene

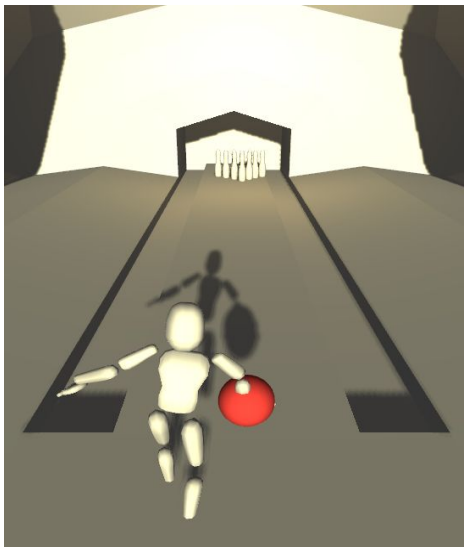
This scene is a good starting point for a blank RUIS scene. You can delete the Floor, Crate, Directional light, and MouseWand gameobjects.

KinectTwoPlayers

This example demonstrates how you can create a multiuser Kinect application in RUIS. The Kinect avatars are equipped with Collider components so that they can push objects around. Also notice how the Kinect-controlled SkeletonWands can be used for object manipulation.

BowlingAlley

Bowling with PS Move controller #0: Use trigger button to grab the bowling ball and release it on your throw. Move-button resets the bowling ball position, and triangle-button places the bowling pins. Kinect is used to control a simple mannequin avatar (*Mannequin* gameobject). Notice how *Mannequin*'s body parts are all parented in a flat fashion and that the "Hierarchical Model" option is unchecked in its script, as opposed to *Constructor* gameobject parented under the *MecanimBlendedCharacter* gameobjects in KinectTwoPlayers and OculusRiftExample scenes.



DisplayManagerExample

Run the scene to see how settings at *DisplayManager* gameobject affect the rendered multi-display output. Additionally you can use mouse, space-key, and WASD-keys to control a simple first person movement. A MouseWand prefab is present, so you can use left mouse button to grab cube objects.

CaveExample

This example with three RUISDisplays illustrates how RUIS can be used for CAVE systems (with head tracking and all). **You can apply keystone correction for projector-based display walls** by accessing the RUIS menu with ESC-key when your scene is running, clicking "Display Management", and dragging the viewport corners. Please note that at the moment that RUIS menu does not respond to mouse clicks on RUISDisplays where "Head Tracked CAVE Display" is enabled, so temporarily disable that option in the RUISDisplays of

CaveExample before applying keystone correction.

Avatar controls

ControllableCharacter and MecanimBlendedCharacter

	Keyboard	**Gamepad**
Move forward / backward	W / S	Left analog stick
Strafe left / right	A / D	Left analog stick
Turn left / right	Q / E	Right analog stick
Jump	Space	Joystick button 1, 5
Run	Shift	Joystick button 0, 4, 7

When Kinect and Jump Gesture are enable, you can jump in real life to make your avatar jump; You need to stand at least 2 meters away from the Kinect, and your both feet need to clearly lift from the ground.

	Razer Hydra (RIGHT, hand-held)	**PS Navigation controller (ID 1, hand-held)**
Move forward / backward	Analog joystick	Analog joystick
Strafe left / right	Analog joystick	Analog joystick
Turn left / right	Buttons 3 / 4	X / O
Jump	Bumper button	L1
Run	Joystick button	L2
		PS Move controller (GEM[1], hand-held)
Grab object	Trigger button	Trigger button

Head tracking controls

	Razer Hydra (LEFT, worn on left ear)	**PS Move controller (GEM[0], worn above head)**	**Keyboard**

Recenter Oculus Rift pose	Bumper + Start	Move button	Return key

Troubleshooting

Kinect 1 issues

- OpenNI (and Windows SDK) often have problems tracking the user properly. This is manifested as limbs jumping around randomly, legs facing backwards, and other poor tracking results. **It is also very common that the lengths of different body parts are poorly detected**: arms are either too short or long, or legs are too big and go underground. Keep enough distance to Kinect (between 2 - 4 meters) so that it can see your whole body.
- For an example of how much floor area the Kinect should be able to perceive, see the screenshot from *Example: Kinect and PS Move calibration* section.
- On some computers it is sometimes necessary to unplug Kinect's USB connector and plug it into a different USB port to get OpenNI examples working.
- **Kinect 1 floor detection in Windows 8 works rather erratically.** If it doesn't work at all for you, you should disable "Floor Detection On Scene Start" for Kinect 1 in Windows 8. In this case the RUISCoordinateSystem script's "Set Kinect Origin To Floor" toggle works only if you manually edit the 'kinectDistanceFromFloor' value from calibration.xml. Such editing needs to be applied AFTER running the Kinect (and PS Move) calibration scene, because it resets the distance value. Your Kinect controlled characters might also appear leaning forward or backward, if your sensor is tilted downwards or upwards.

Kinect for Windows (Kinect 1)

Microsoft released Kinect 1 for Windows and Kinect 1 SDK, but they are not compatible with OpenNI. The kinect-mssdk-openni-bridge is an experimental module that connects Kinect SDK to OpenNI and allows people with Kinect for Windows to use OpenNI applications. This bridge _might_ get RUIS to work with Kinect for Windows but there are no guarantees:
https://code.google.com/p/kinect-mssdk-openni-bridge/

Razer Hydra

If you use Razer Hydra, **add the *SixenseInput* prefab into your scenes**, and toggle on 'Enable Razer Hydra' from *InputManager* gameobject (parented under *RUIS* gameobject).

If you use Oculus Rift together with Razer Hydra, you won't see the calibration instructions upon loading a scene: 1. Point the left controller towards the base station and then press the shoulder button. 2. Do the same with right controller.

When starting a scene with Razer Hydra, its buttons sometimes get "stuck" and for example the MecanimBlendedCharacter moves automatically even without touching the buttons. If this

happens, restarting the scene or unplugging and reconnecting the Razer Hydra USB cord can help. Razer Hydra can also sometimes get confused about directions or lose one controller altogether, in which case you need to restart the demo.

PS Move

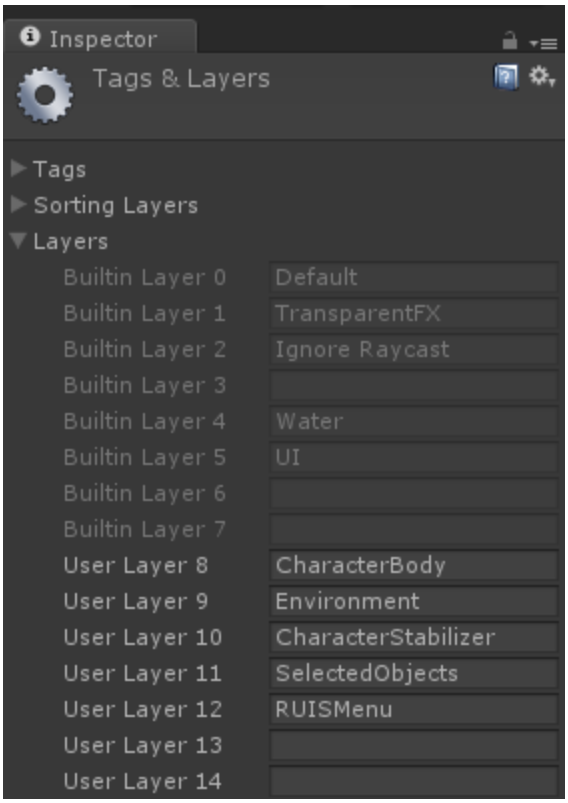
Check that your computer and PlayStation are connected to the same network, and that the PlayStation is able to obtain an IP address. Make sure that the address for Move.me server and port in InputManager gameobject is the same as displayed in the Move.me software on PlayStation. Also make sure that “Load from File in Editor” is disabled in the InputManager. If you successfully connect RUIS to Move.me server, the PlayStation3 screen should display something like this:

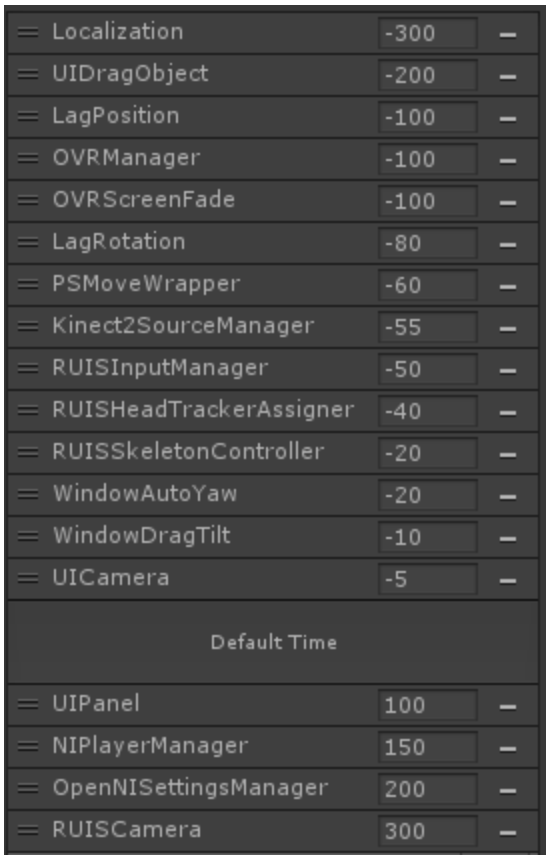
If RUIS for Unity is not able to connect to PlayStation via TCP (Move.me software displays “Connections: 0”), please check your firewall settings. If your application is connected to Move.me server but does not update PS Move state this may also be a firewall issue (Move.me sents PS Move state over UDP to RUIS).

Unity editor and individual standalone executables have to be allowed through the firewall. In a standalone build you will have to set the IP address and port inside a file named inputConfig.txt that needs to be located in the same folder where the standalone executable file is. For an example of the file format please check the file provided in \RUISunity\ .

Layers, Script Execution Order, and creating a UnityPackage of RUIS

If you create a UnityPackage of RUIS with the intention of importing RUIS to your existing Unity project, you need to create the layers displayed in the below left image (with the same indices and names):





You also need to set up the Script Execution Order presented in above right image. Nearly half of the scripts come from NGUI, which we use in our in-game menu.

Safety Warning

Wearing head-mounted-displays while standing up, moving, walking, or jumping is dangerous to your health and potentially deadly. Author of this software recommends you to avoid the aforementioned actions, and if you choose to perform them anyway, you do it at your own risk. The author of this software cannot be held responsible in any way for any consequences.

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