

Experiments with Scale

Summary

The purpose of these second experiments is to explore the notion of scale in VR. We developed two experiments: Lilliput and Doll House.

Lilliput

The Lilliput experiment consists in two separate VR environments, one based on Oculus Rift DK2 and the other based on HTC Vive. These two worlds are connected, but with different scales.

In the first episode "The Beast and The Beauty", the Robot player, using Oculus Rift, is big and the girl Elaine, using the Vive is small. See Fig 1 and Fig 2.

We produced two takes of this scenario, exploiting alternative visualizations.

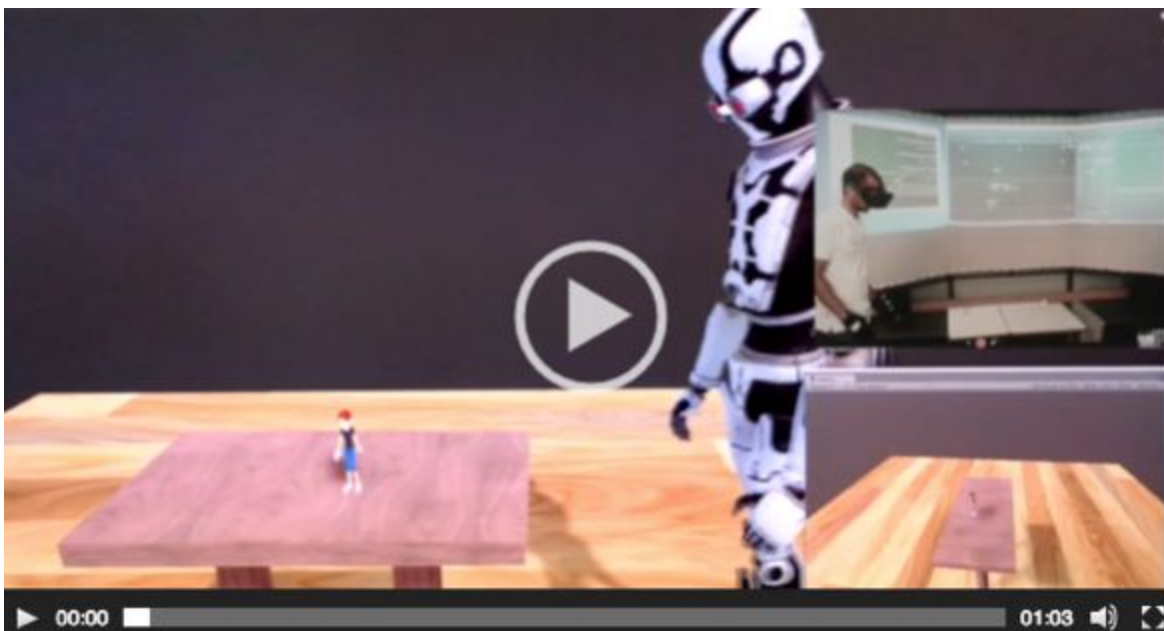
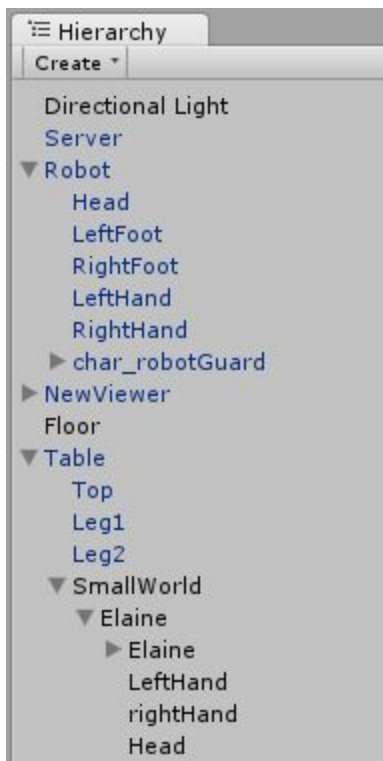


Fig 1. Episode One: The Beast and The Beauty



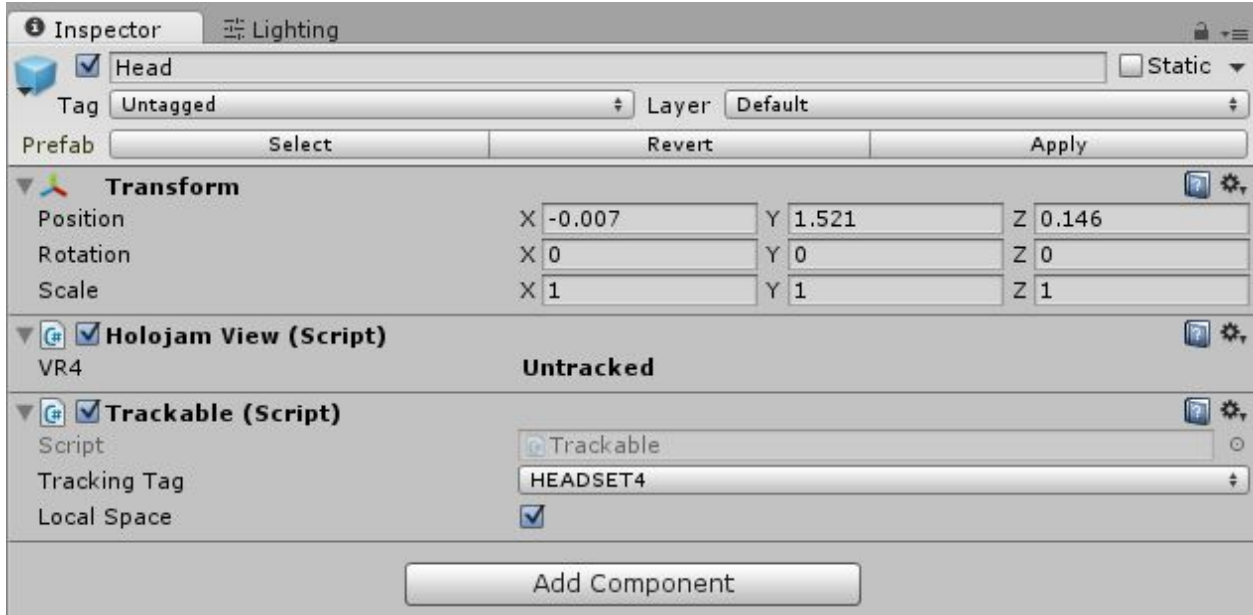
Fig 2. Episode One: The Beast and The Beauty (take 2)

This is the hierarchy of this scene:



SmallWorld object is positioned on the table, is has a uniform scale of 0.1, this is what makes everything inside it small, in this case it was just the character *Elaine*.

In the head and hands, the tag "Local Space" from Trackable component is set true:



In the second episode "The Beauty and the Beast", the Robot player, using Vive, is big and the girl Elaine, using the Oculus Rift is small. See Fig 3.

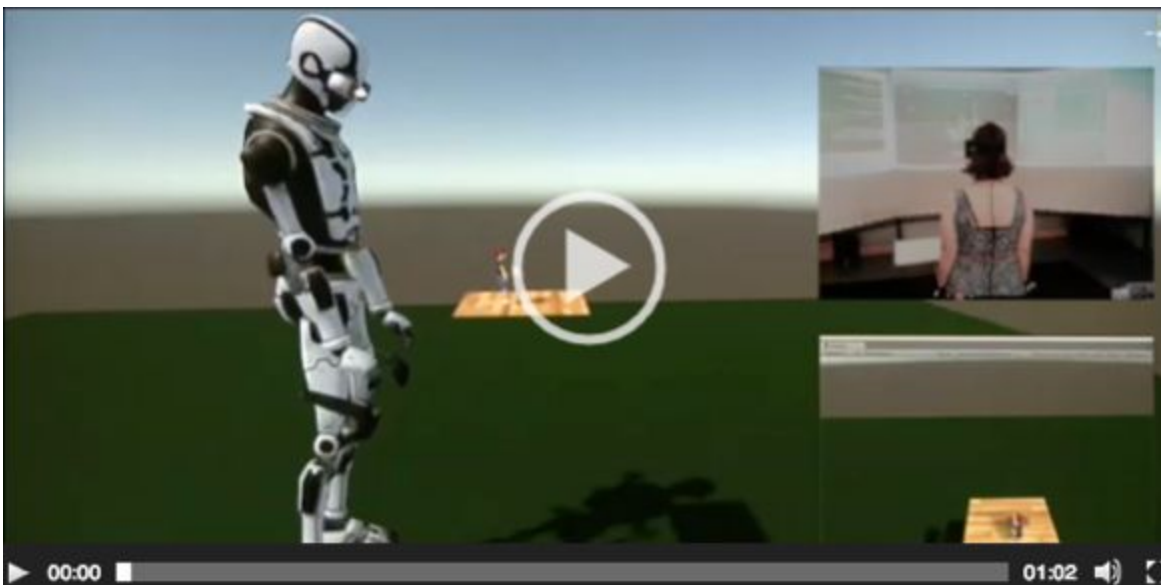


Fig 3. Episode Two: The Beauty and the Beast

This scene has a similar scheme to the previous one, but now it is configured such that the small world is mapped to the room with Oculus rift:



Doll House

The experiment consists of a scenario with a miniature house in which the player can "shrink" and get inside the house. See Fig 4 and Fig 5.

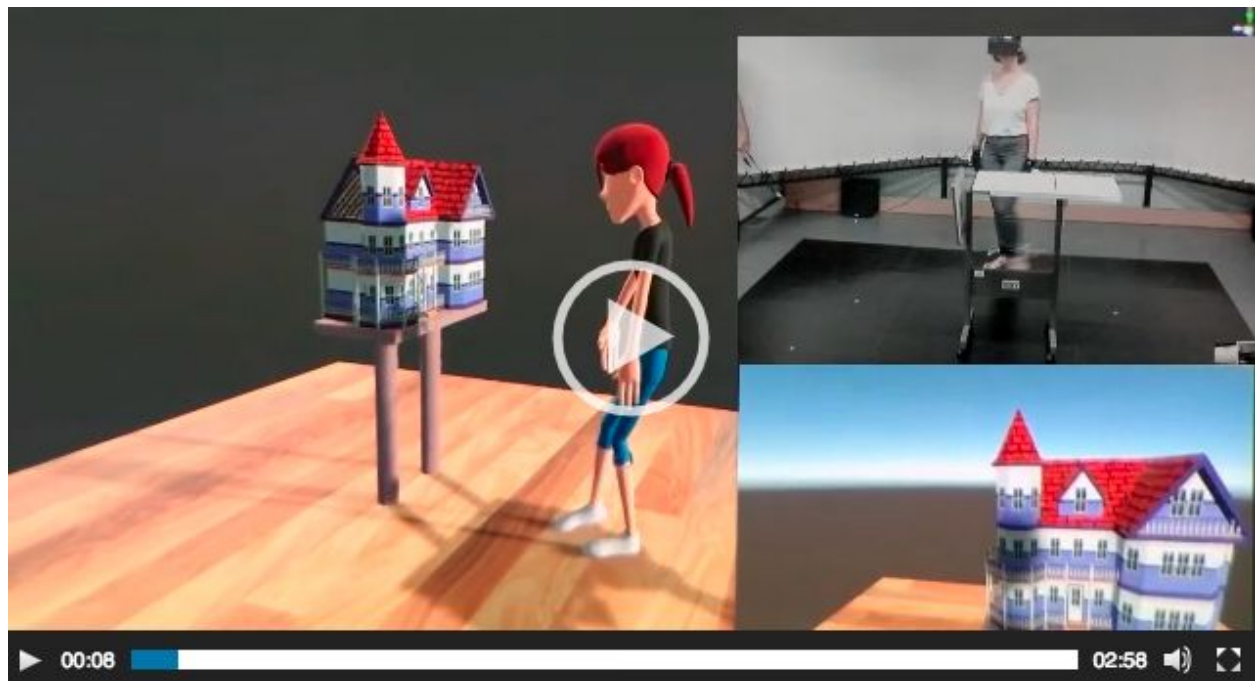


Fig 4. Doll house

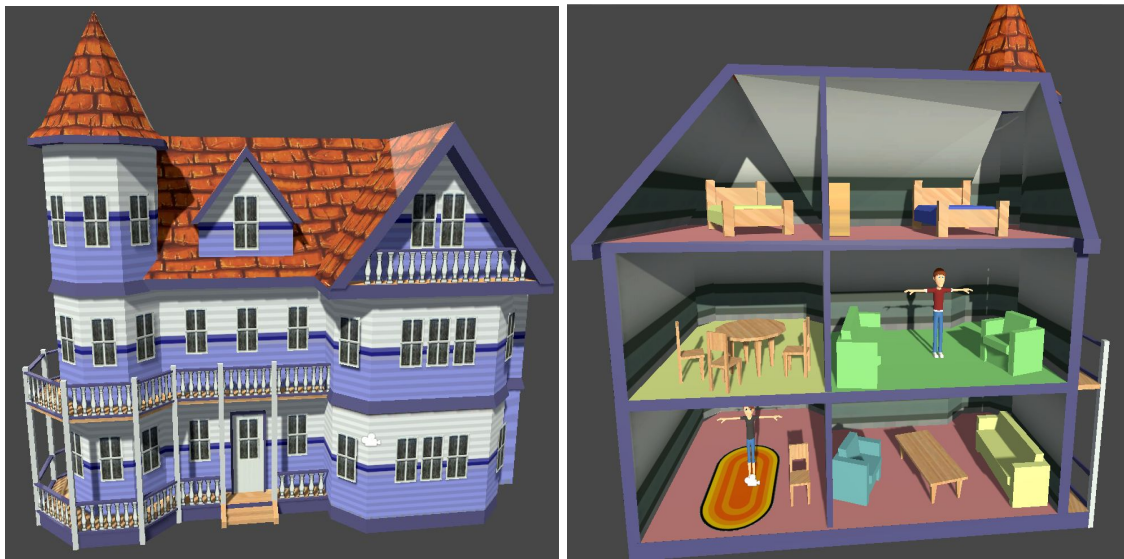


Fig 5 - Dollhouse Model - Front / Back

This is the hierarchy of this scene:



The "*world*" object has a script that makes a transform transition between the current transform and a transform of some dollhouse room.

This transition is activated by another script component in the stylus object whenever there is a collision with one of the colliders that are positioned inside each room of the dollhouse. Wand's button A makes the world go back to the normal scale.

There is also a *Smallworld* object where the other character is positioned. It is positioned inside of the rooms of the dollhouse. The Vive objects (camera and wands) are positioned in this object.

Lara and The Robot: A Lilliput Story

The experiment tells a story of the encounter of Lara Croft with Robocop. Lara lives in a Lilliput city and the Robot is a giant that is exploring this land. See Fig 7.

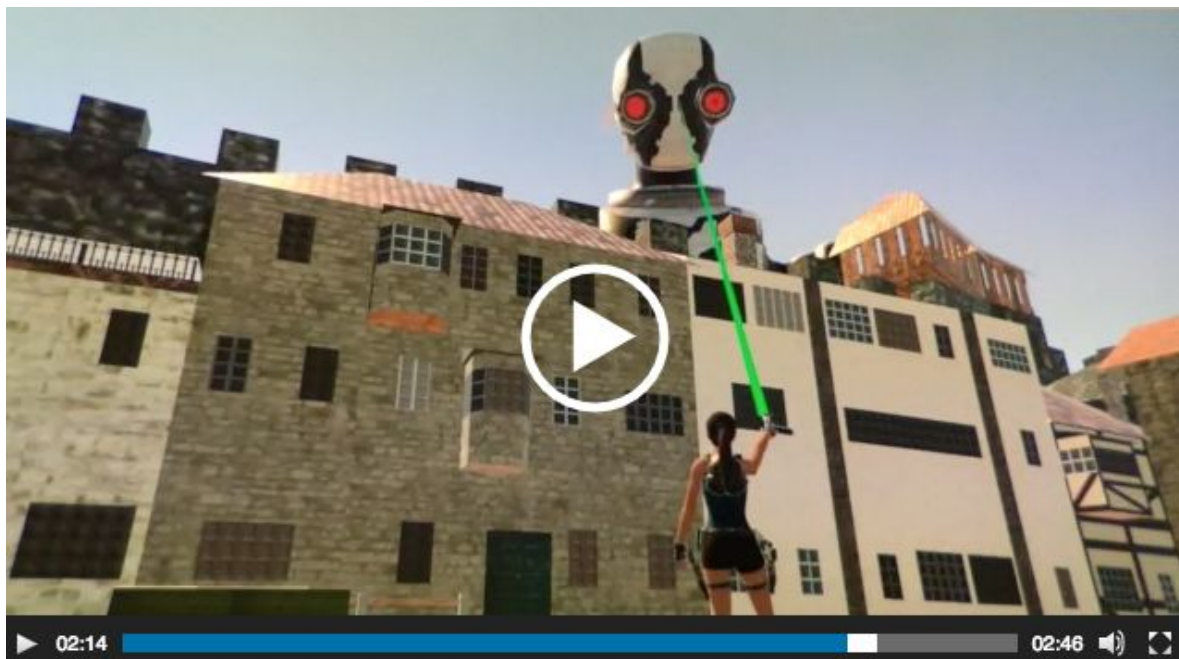
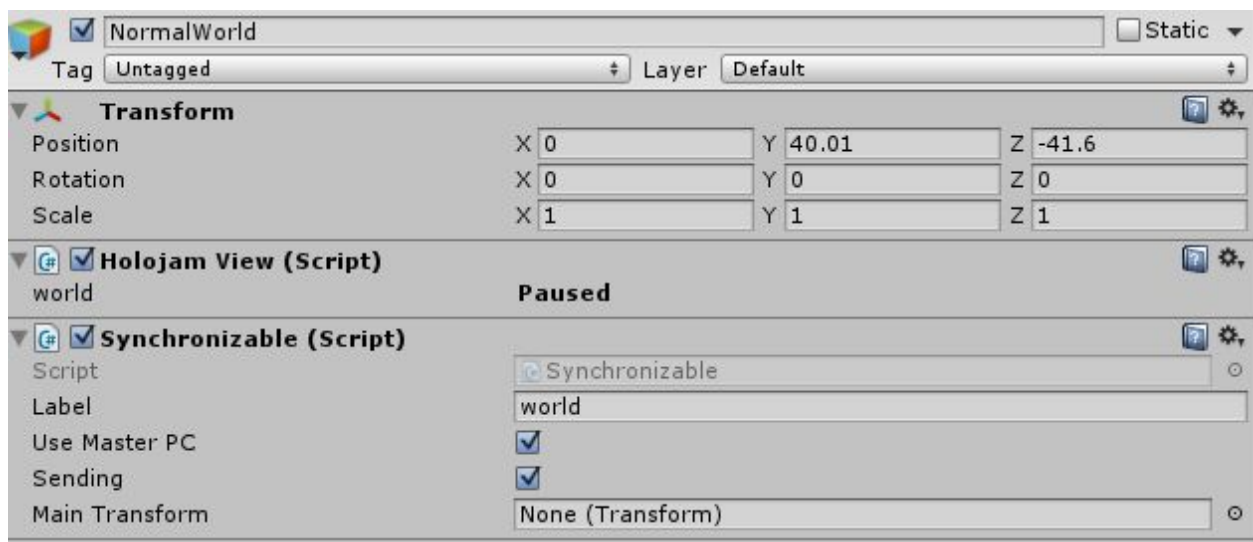


Fig 7 - Lara and the Robot

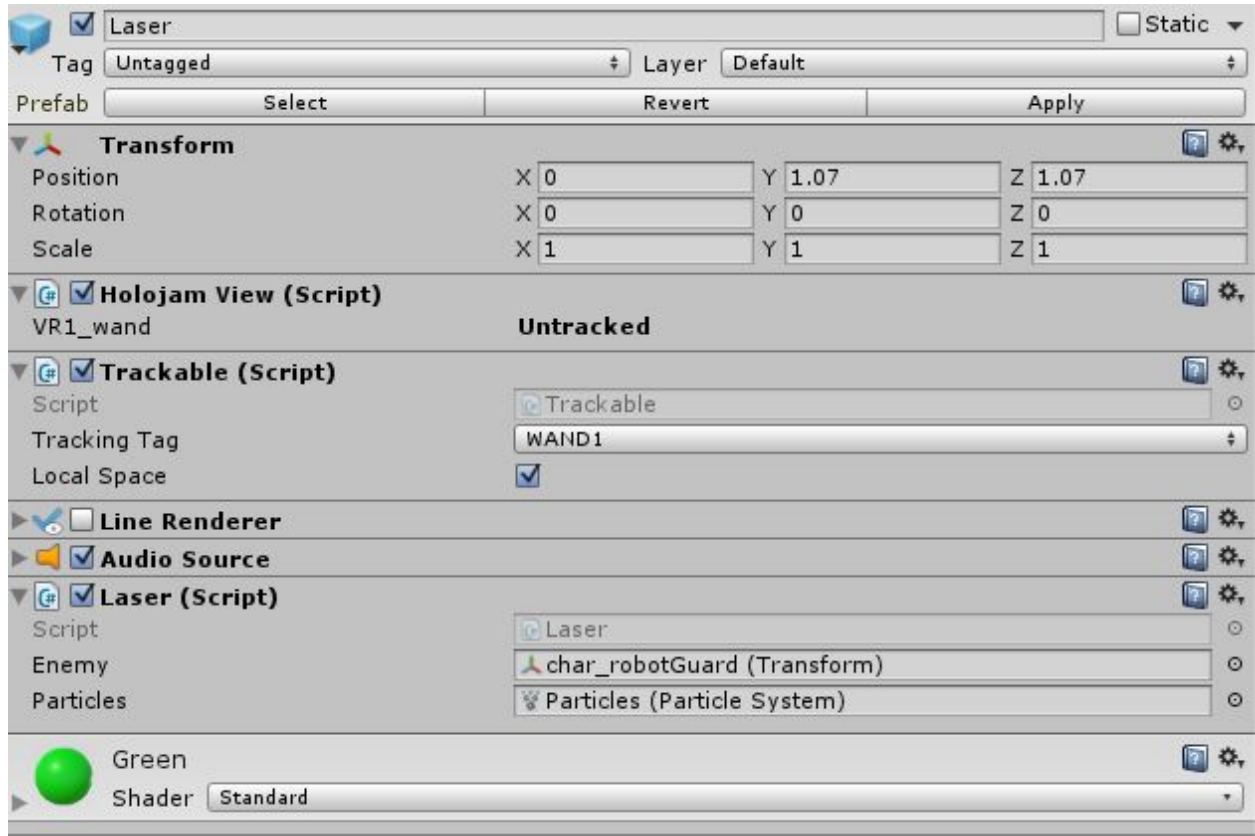
For this experiment, we used two groups of objects, one called NormalWorld, and the other called BigWorld, as can be seen from the hierarchy below:



NormalWorld contains the elements at normal size: the viewer, Lara Croft model and the Laser gun model. It is also a Holojam Synchronizable object, so it can be positioned anywhere in the city from one instance of the program, and others will see where it is positioned.



The Laser object contains a script to control a laser beam that is shot when the user presses the trigger button of the wand. It also has an audio source with a laser sound that is played whenever the gun is fired. The script knows what object corresponds to the enemy, and what is the particle system that is used for generating a sparks effect when this enemy is shot.



BigWorld contains the Robot and a particle system that is used for the sparks effect when Lara shoots the robot. It has a uniform scale increasing its size by 100 times. In the figure below we can see a comparison between the robot and the whole city:

