Course: VR Systems and Humans

Assignment 2

Bad Visuals

Group: #9

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Task1

Room 1:

There is a illuminated red cube in this room visible only to our left eye and invisible to the right eye. Moreover, we notice that although this is a lit cube, the room is still completely dark without any reflection or light from the cube.

- Software problem
- Fix by coding the box to show on both lenses
- Discomfort is quite strong 7/10

Room 2:

We can see a bright white cube similar to room 1 in the middle of the room. In this case, the cube changes brightness or it can be when we try to look around the room possibly due to automatic brightness adjustment and the room is similarly to earlier not lit up by the cube. In addition, the framerate is very low causing quite a lot of discomfort when looking around or moving the controllers where you can see them.

- Edges of the cube have color distortion due contrast.
- Software problem or a hardware problem with the low framerate
- Fix by improving frame rate and reducing the contrast
- Discomfort is quite strong 8/10

Room 3:

There is a cube the same size as the first two rooms however, this cube is a color that is difficult to describe. When we use only our left eye to look the cube is red while looking with the right eye tells that the cube is green. As a consequence, when we try to look at it through both of the eyes, this cube becomes a yellowish one, but it is not a solid yellow but a uneven mix of the original colours and the resulting yellow. In this case too, it is a shining cube, but the room is also dark without any reflection like room 1 and 2. Color distortion again due contrast between the bright cube and dark room.

- Software problem
- Fix by making the colors the same on both eyes and reducing the contrast
- Discomfort is quite strong 7/10

Room 4:

After entering the room vision becomes distorted. The left eye can see the room normally, whereas the room is blurry in the right eye. Making it definitely uncomfortable to look around in this room.

- Hardware problem with the focusing of the lense
- Fix focusing in the lense assembly

- Again the discomfort is quite strong 8/10

Room 5:

In room 5, we see two cubes with a different texture from the previous rooms. However, the quality of graphics of the right cube is lower than the left cube and the left eye views when viewed using our right eye. In addition, the tracking of controllers of our hands in this room were desynchronized and often disappeared. Another thing is about the view, which means when we enter the room, we have a little higher view than when standing outside of the room. Sort of feeling of levitating in the air that does not feel comfortable. Due the contrast there is again some color distortion.

- Software problem when displaying different textures for each eye and player scale issue
- Fix by maintaining the height and displaying the same texture for each eye and by correcting the hand tracking
- Discomfort 6/10 the problem with height is easy to detect but not that uncomfortable

Room 6:

Once entering room 6, we see two pictures hanging on the wall. The color of these pictures changes when we look through a different eye. Particularly, if we use the left eye to see these pictures, the bottom part of the left picture is blue, whereas if we use the right eye, this part of the picture is yellow. The tone of color from the right picture also changes when we use a different eye. Testing pressing the spacebar did not noticeably impact the experience other than the lack of tracking.

- Software problem and a human perception capabilities problem
- Fix the colors to be the same on both eyes
- Discomfort 5/10

Room 7:

Room 7 has a red light and white smoke inside. However, based on the reflection, the smoke should be lit by red light instead. Moreover, we notice that the smoke is two dimensional, which leads to unrealistic movement when compared with the normal movement of the smoke. In addition, there are several white streaks on the wall from lighting error, but it should have some reflection from the red light. The brightness of the red light keeps changing after movement possibly due to a automatic brightness adjustment. Finally, we cannot see the shadow from the smoke and the light. When teleporting out of the room the orientation changes possibly due to broken wall anti-teleport hitboxes. For example moving straight forward the orientation turns back towards the room 9.

- Maybe SW problem with orientation & issues with visual and graphical elements
- Fix orientation & visual issues
- Discomfort 0/10 not really discomfort at all, only visual issues that do not majorly contribute to nausea though the orientation bug would be really annoying in some real application.

Room 8:

The objects in this room are the same as the previous one (red light and white smoke). However, we get strange shadows and lighting on hands/controllers. The horizon started to cumulatively tilt slowly while moving in the room. Maybe related to tilting and rotating the headset while in the room.

- SW or HW problem in gyroscope or tracking software
- Fix the slow tilting of the view
- Discomfort 0-8/10 depending on the level of tilt

Room 9:

This room is the same as the last two previous rooms (room 8 and 7). In this room, when we try to move our head, the smoke follows the rotation of the headset not the direction of the headset. Therefore, we can see that the smoke moves around unnaturally when moving the head. I think this room also had problem with moving out of the room and the orientation changes.

- SW problem with the orientation of the smoke
- Fix the smoke to the head movement and direction
- Discomfort 3/10 or less. Could be more discomfortable when moving if there was more smoke.

Task2

Design room 1:

In the room the head rotational tracking is exaggerated or understated to create a difference between the expected head rotation and the displayed head rotation. This should create a mismatch between the sensed movement by the ear and the visual movement as seen by the eyes potentially inducing nausea. The difference between exaggerated and understated movement could also be compared to see if either causes a bigger effect.

Design room 2:

In the room the framerate is occasionally suddenly lowered to produce a “lagspike” to simulate the effect of loading something, displaying graphically intensive effects or other intensive tasks causing a drop in performance on a lower performance system. The frequency, duration, intensity and the consistency of the these sudden drops could be varied to see if sudden effects cause more nausea than a constant low framerate or if their length and frequency cause a significant difference in their level of discomfort.