

Lecture discussion 18-jan-23

Markdown formatting guide [here](#)

Perception and Human Factors

-Edited by Dan-

.
.
.

Perception Nuclear Control Room Operations

-Edited by Gbenga-

.
.
.

Immersion in VR

-Edited by Zeth-

.

What is Reality?

ChatGPT: The allegory of the cave is a story told by the ancient Greek philosopher Plato in his work "The Republic." It is a metaphor for the human condition and the nature of knowledge and understanding. The story goes that a group of people are trapped in a cave, only able to see shadows on the wall in front of them, which they take to be reality. One person escapes the cave and sees the true reality outside, but when they try to tell the others, they do not believe him and prefer to stay in the cave. The allegory is often interpreted as a commentary on the limitations of human perception and the power of education to transcend those limitations.

- [YouTube](#): A Storyteller's Guide to Using Allegory (StudioBinder, 2022)

Dr Donald Hoffman: What we call 'reality,' consists of an elaborate papier-mâché construction of imagination and theory filled in between a few iron posts of observation (Hoffman, 2019).

Stephen Pinker: We are organisms, not angels, and our minds are organs, not pipelines to the truth. Our minds evolved by natural selection to solve problems that were life-and-death matters to our ancestors, not to commune with correctness or to answer any question we are capable of asking. We cannot hold ten thousand words in short-term memory. We cannot see in ultraviolet light. We cannot mentally rotate an object in the fourth dimension (Pinker, 1997).

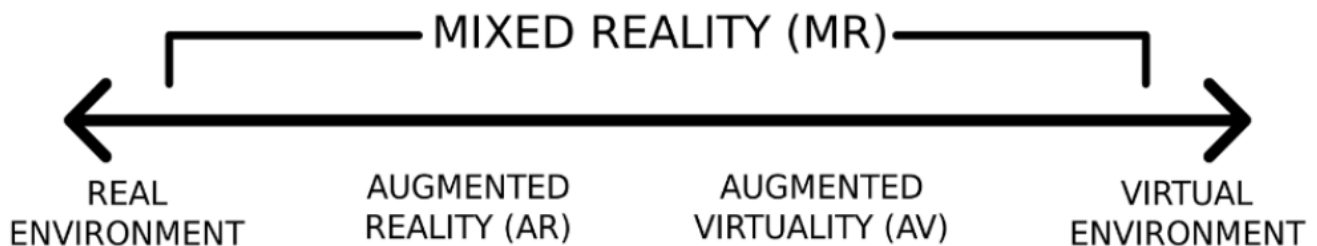
Nathan Seiberg: I am almost certain that space and time are illusions. These are primitive notions that will be replaced by something more sophisticated.

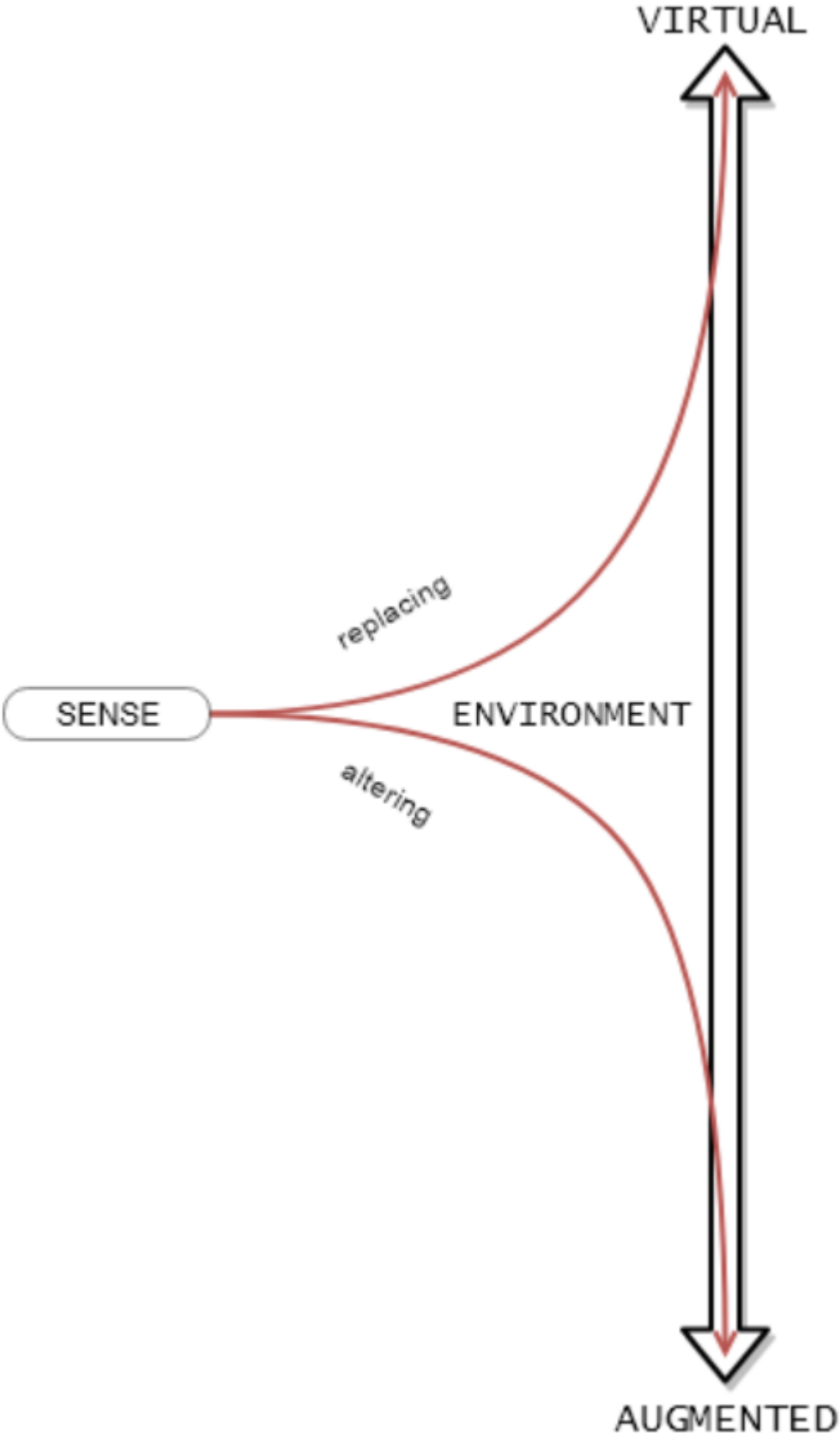
(Time, Space Obsolete in New View of Universe - Los Angeles Times, 1999)

What is "VR"?

Virtual Reality is one conceptual mediated reality class often seen as a end-pole on the continuum of *mixed reality*, with *augmented reality*, *augmented virtuality* and so-called *real reality*. The diagrammatic arragnment of theses terms can be applied under various logics.

Cross reality (XR) is yet another mix, one in which the virtual agents and/or the real agents encountered adopt a level of interactive automony--perhaps even conscious behavior.





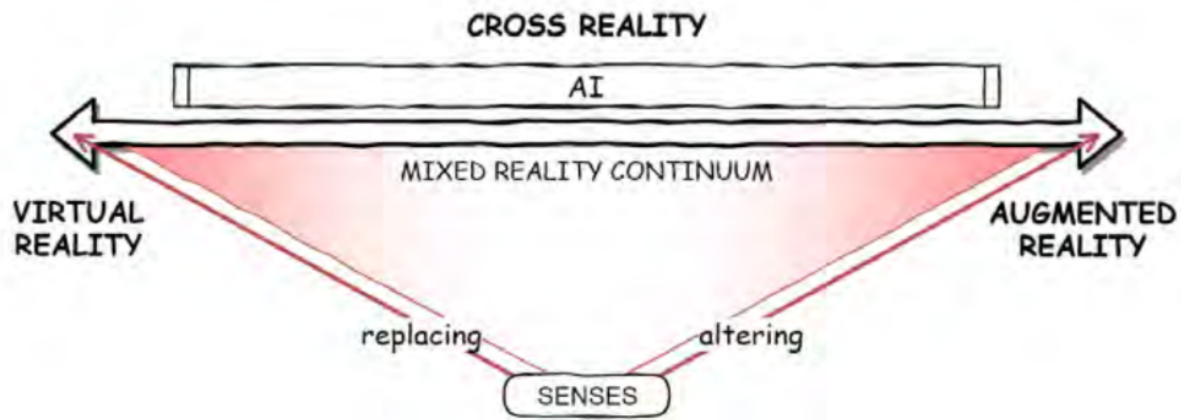


Figure 3.2: Conceptual model for mediated reality classes

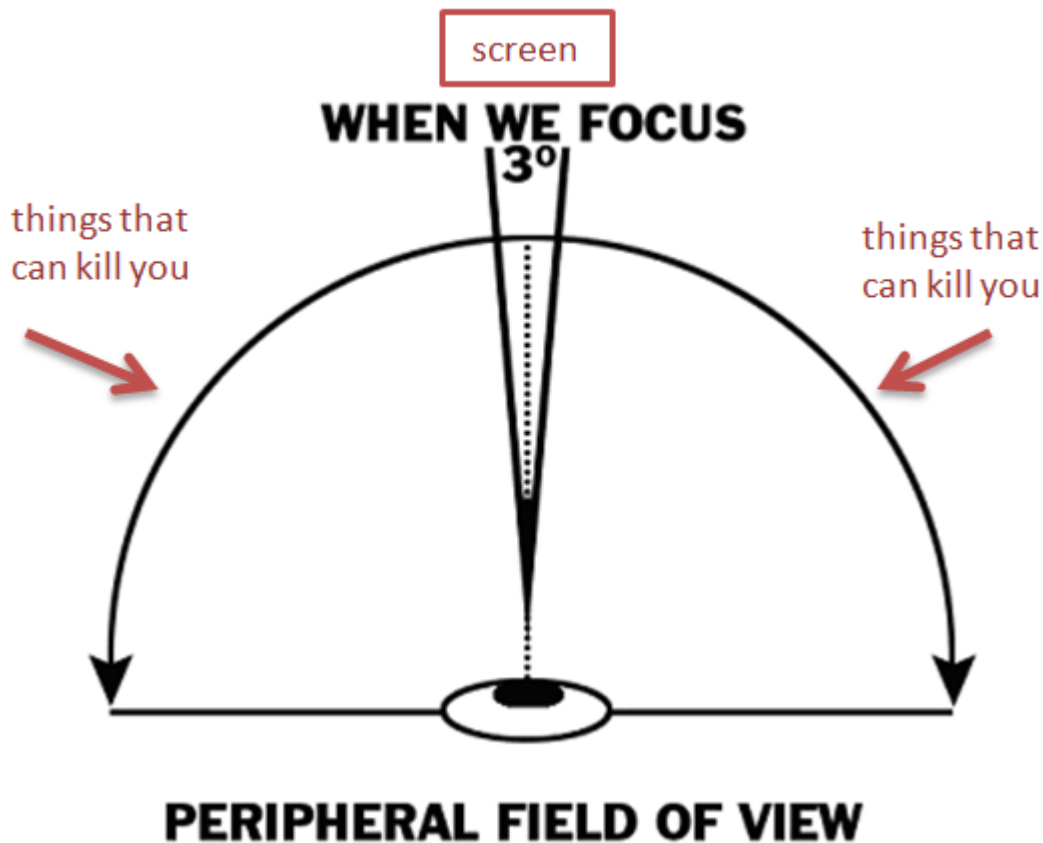
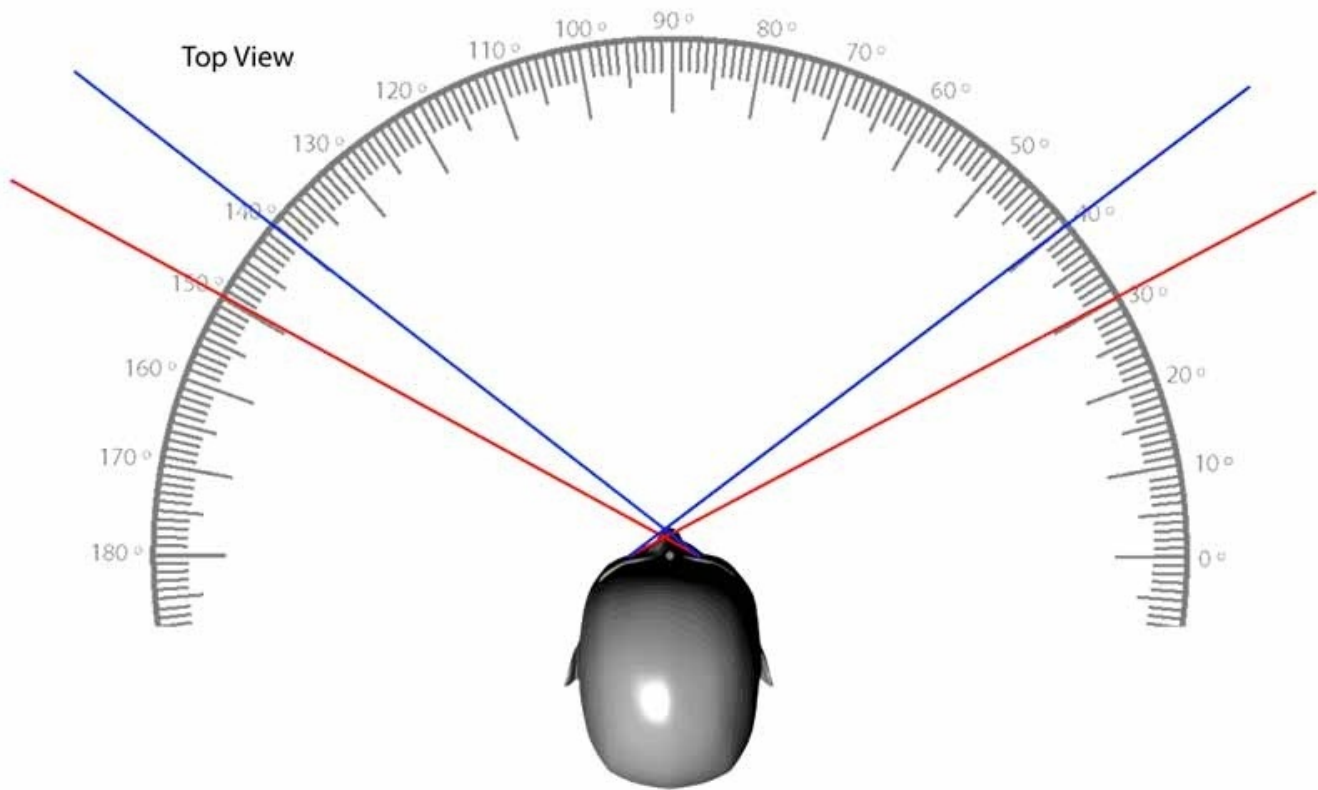
Figures from the author's research and thesis (Dubois, 2020)

Critical Sensations of Contemporary VR Systems

- Vision
- Auditory
- Proprioception

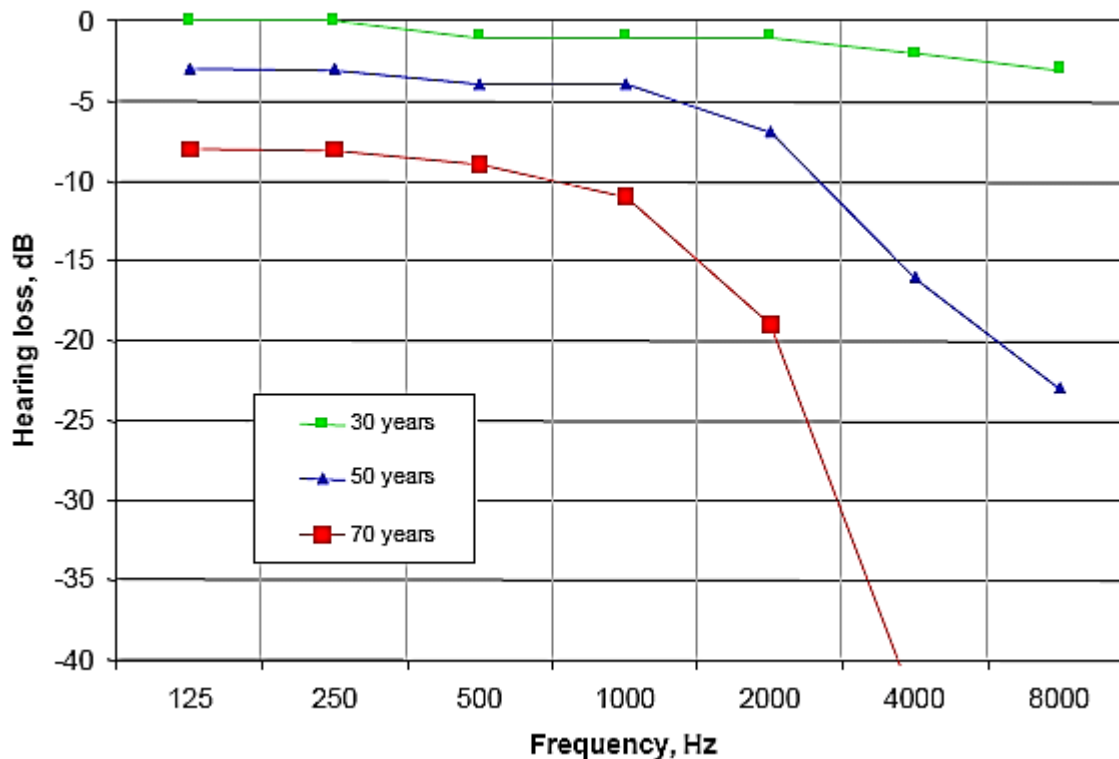
Vision

Human Stereoscopic Field of View



Auditory

The human range is commonly given as 20 to 20,000 Hz, although there is considerable variation between individuals, especially at high frequencies, and a gradual loss of sensitivity to higher frequencies with age is considered normal.



Proprioception

Proprioception refers to the sense of the body's position and movement in space. It is responsible for the sense of where one's limbs are without having to look at them. Proprioception is crucial for immersion in virtual reality because it allows the user to feel like their virtual body is their own, rather than just an avatar on a screen. If proprioception is not accurately represented in a VR experience, it can lead to a disconnect between the user's physical body and their virtual body, reducing immersion and causing discomfort. For example, if a user's virtual hand is shown to be reaching for an object, but their physical hand does not have the same sensation of movement, it can create a disconnect that breaks immersion. On the other hand, if proprioception is accurately represented in VR, it can enhance immersion by allowing the user to feel like they are truly present in the virtual world.

Fidelity

Suspension of disbelief: how much fidelity does immersive VR require?

Solid evidence of virtual reality's benefits has graduated from impressive visual demonstrations to producing results in practical applications. Further, a realistic experience is no longer immersion's sole asset. Empirical studies show that various components of immersion provide other benefits - full immersion is not always necessary. The goal of immersive virtual environments (VEs) was to let the user experience a computer-generated world as if it were real - producing a sense of presence, or "being there," in the user's mind (Bowman & McMahan, 2007).

Check out Keiichi Matsuda's nightmare AR videos from 2008.

<https://vimeo.com/chocobaby>

References

Bowman, D. A., & McMahan, R. P. (2007). Virtual Reality: How Much Immersion Is Enough? *Computer*, 40(7), 36–43. <https://doi.org/10.1109/MC.2007.257>

Hoffman, D. (n.d.). *Donald Hoffman: Do we see reality as it is?* | TED Talk. Retrieved January 13, 2023, from https://www.ted.com/talks/donald_hoffman_do_we_see_reality_as_it_is

Hoffman, D. (2019). *The case against reality: Why evolution hid the truth from our eyes*. WW Norton & Company.

Immersion in Virtual Reality—Linde. (n.d.). Retrieved January 13, 2023, from <https://vr.linde.com/2022/07/21/immersion-in-vr/>

Science and Nonduality (Director). (2013, December 10). *Consciousness and The Interface Theory of Perception, Donald Hoffman*. <https://www.youtube.com/watch?v=dqDP34a-epl>

Tuthill, J. C., & Azim, E. (2018). Proprioception. *Current Biology*, 28(5), R194–R203. <https://doi.org/10.1016/j.cub.2018.01.064>

What Is Reality? An Interview with Donald Hoffman | *Psychology Today*. (n.d.). Retrieved January 13, 2023, from <https://www.psychologytoday.com/us/blog/consciousness-self-organization-and-neuroscience/201912/what-is-reality-interview-donald>