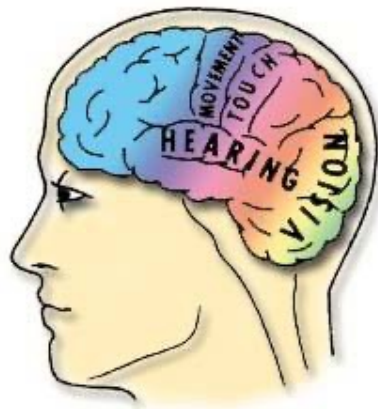


MultiModal Interaction, Part I

Course code: INFOMMMI, 7.5 EC
Period: 2024, Feb 14 – 23
Teacher: prof Peter Werkhoven

Perception



- 1a Vision
- 1b Motion & Stereo
- 2a Hearing & Touch
- 2b Multi-sensory & Synaesthesia

Virtual Reality



- 3a VR tech & app
- 3b Interaction
- 4a Emotions & stress
- 4b Brain-machine

Structure

- **Lectures** (perception, VR)
- **Literature** (6 scientific papers)
- **Exam** (lectures + literature; open questions)

Lectures

Date	Activity	Lecturer Peter Werkhoven
Wed Feb 14	15.15-17.00 - Lecture 1 (Vision, motion, stereo) >>> study: papers 1,4	BOL – 0.204
Fri Feb 16	09.00-10.45 - Lecture 2 (Hearing, touch, multimodal) >>> study papers 2,3	KGB - ATLAS
Wed Feb 21	15.15-17.00 - Lecture 3 (VR technology, human factors) >>> study papers 5,6	BOL – 0.204
Fri Feb 23	09.00-10.45 - Lecture 4 (Emotions, Brain-machine)	KGB - ATLAS

KGB = Koningsberger-gebouw, Budapestlaan 4

BOL = Bolognelaan 101

<https://ics.uu.nl/docs/vakken/mmmi/2023-2024/index.html>

Literature

Multisensory perception*

1. Ernst, M.O. & Bulthoff, H.H. (2004). **Merging the senses into a robust percept.** *Trends in Cognitive Sciences*, 8(4), 162-169.
2. Petkova, V.I., & Ehrsson, H.H. (2008). If I Were You: **Perceptual Illusion of Body Swapping.** *PLoS ONE* 3(12): e3832. doi:10.1371/journal.pone.0003832.

Navigation in VE

3. Wolbers, T., Hegarty, M. (2010). **What determines our navigational abilities?** *Trends in Cognitive Sciences*, 14(3), 138-146.

Emotions in VE

4. Schreuder, E., Erp, J. van, Toet, A., Kallen, V.L. (2016). **Emotional Responses to Multisensory Environmental Stimuli:** A Conceptual Framework and Literature Review. *SAGE Open*, 6(1).
5. Veelen, N. van et al. (2021). **Tailored Immersion:** Implementing Personalized Components Into Virtual Reality for Veterans With Post-Traumatic Stress Disorder. *Frontiers in Virtual Reality*, 2 (art 740795).

Emerging technologies

6. Lee, V.K., Nau A.C., Laymon, C., Chan K.C., Rosario B.L., Fisher C. (2014). **Successful tactile based visual sensory substitution** use functions independently of visual pathway integrity. *Frontiers in Human Neuroscience*, 8, 291.

* **For a general background in perception:** Goldstein, E.B. (2017). *Sensation and Perception* (10th Ed).

Exam (lectures + literature)

Papers

Navigational abilities (Wolbers & Hegarty, 2010) :

Question - Describe the term 'cognitive map'. (~ 30 words)

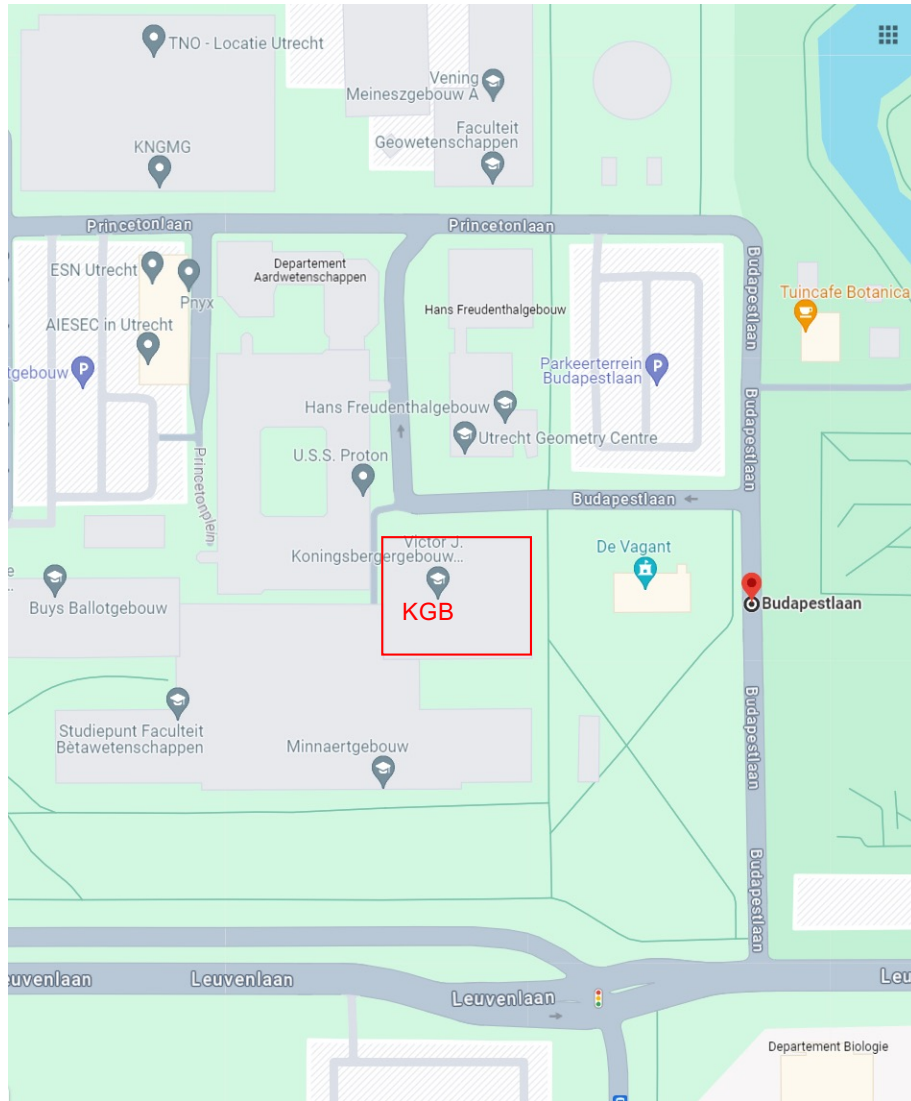
Answer - Internal representation of the structure of the environment. Spatial relationships (i.e. directions and distances between objects) can be inferred from any perspective.

Lectures

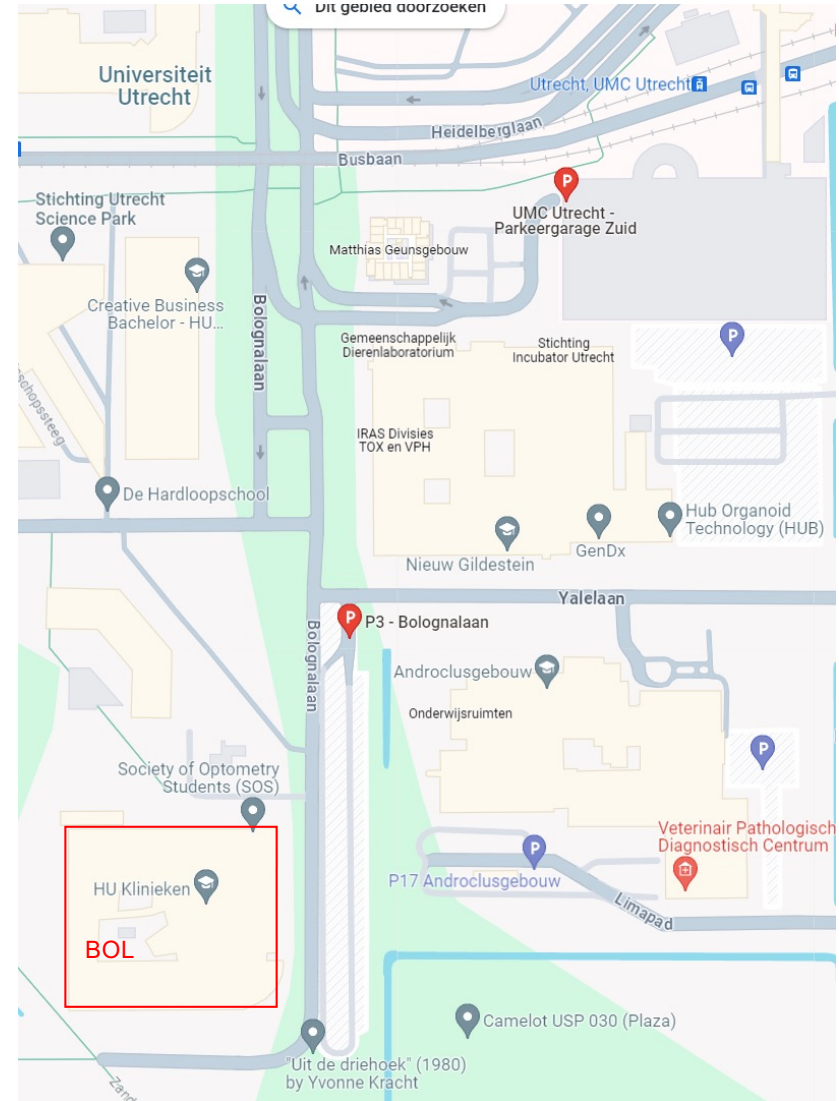
Question - Describe the most important functional disadvantage of the optical versus digital combination of virtual and real worlds (augmented reality) using head mounted displays. (~ 40 words)

Answer - No occlusion possible in optical combination because no depth information is available for combination with the virtual world.

Locations



KGB = Koningsbergergebouw, Budapestlaan 4



BOL = Bolognelaan 101