Investigating the impact of low vision on navigational behaviors with virtual reality

Supervisors

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Hosting laboratory

Centre Inria d'Université Côte d'Azur

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Duration

4-6 months, starting between January - March 2024

Salary

550€ / month

To apply

Contact:

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with your CV and latest transcripts. A short (1 paragraph) statement of motivation is appreciated.

Description

This internship is situated in the context of ANR CREATTIVE3D (https://project.inria.fr/creattive3d/), a French state-funded project that deploys virtual reality headsets (VR) to study navigation behaviors in complex environments, and the impact of low-vision conditions. We aim to model multi-modal user attention and behavior, and use this understanding for the design of assisted creativity tools and protocols for the creation of personalized 3D-VR content for and rehabilitation.

When using virtual reality for real-life applications such as rehabilitation and training, cognitive and behavioral measures are put in place to better understand the user experience and evaluate the effectiveness of these applications. Questionnaires are a popular tool to measure the sense of presence [Sla99],

emotion [BBC04], and broader user experiece components including immersion and engagement [TLC16], which have been notably been adopted by Jicol et al. [JWD21] to investigate the interplay between agency, presence, and emotion with the use of structural equation models. Our recent work combining the use of physiological sensors and gaze tracking [GRB22] investigated correlations between attention, emotion, and content saliency when viewing 360 videos in VR.

The internship project aims to study the impact of low vision when carrying out 6 degrees of freedom navigation tasks in virtual reality, in a clinical setting at the Institut Claude Pompidou, Nice. The recruited intern will integrate into the multidisciplinary team to carry out two principal tasks:

1. Assist in observational clinical trials with low-vision patients on navigation in VR. The study involves data collection with physiological sensors, user logs, and questionnaires.
2. Conduct analysis on study data to investigate a set of hypotheses on the impact of low-vision on VR navigation tasks.

Competences

- Required:
    - Background in cognitive science or neuroscience, specializing in visual perception, action, and/or emotion
    - Prior experience in user studies or clinical interactions with patients
    - A good level of French and English (speaking and writing)
- Appreciated:
    - Passion in virtual reality technology
    - Competences in statistical analysis, backed by coursework and/or projects in R, Matlab, or Python

References

[BBC04] Baños, R. M., Botella, C., Alcañiz, M., Liaño, V., Guerrero, B., & Rey, B. (2004). Immersion and emotion: their impact on the sense of presence. Cyberpsychology & behavior, 7(6), 734-741.

[GRB22] Guimard, Q., Robert, F., Bauce, C., Ducreux, A., Sassatelli, L., Wu, H. Y., ... & Gros, A. (2022, June). PEM360: A dataset of 360° videos with continuous Physiological measurements, subjective Emotional ratings and Motion traces. In Proceedings of the 13th ACM Multimedia Systems Conference (pp. 252-258).

[JWD21] Jicol, C., Wan, C. H., Doling, B., Illingworth, C. H., Yoon, J., Headey, C., ... & O'Neill, E. (2021, May). Effects of emotion and agency on presence in virtual reality. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-13).

[Sla99] Slater, M. (1999). Measuring presence: A response to the Witmer and Singer presence questionnaire. Presence: teleoperators and virtual environments, 8(5), 560-565.

[TLC16] Tcha-Tokey, K., Loup-Escande, E., Christmann, O., & Richir, S. (2016, March). A questionnaire to measure the user experience in immersive virtual environments. In Proceedings of the 2016 virtual reality international conference (pp. 1-5).