

Impact of inter-individual differences on the Sense of Embodiment in Immersive Virtual Environments

Arts et Métiers institute of technology, LAMPA (EA1427), Presence and Innovation team

Keywords:

Virtual Reality; Avatar; Embodiment; Inter-individual differences; Personality traits; Suspension of Disbelief.

Research project:

Virtual reality technologies allow people to embody and control virtual characters (avatars) in real time [Kiltenei *et al.*, 2012]. Using headsets and motion-capture suits, one could substitute his/her real body in immersive virtual environments [Banakou *et al.*, 2013; Kiltenei *et al.*, 2013; Peck *et al.*, 2013; Slater *et al.*, 2010]. Several research, including previous work from our laboratory, investigated the impact of perceptual and graphic modalities on the sense of embodiment in virtual reality. It has been demonstrated that bottom-up factors (e.g. visuotactile and visuomotor synchrony, viewpoint, etc.) [Kokkinara et Slater, 2014; Gorisse *et al.*, 2017] and top-down factors (e.g. visual fidelity) [Waltemate *et al.*, 2018; Gorisse *et al.*, 2019] could impact the senses of self-location, agency and ownership toward a virtual body. However, little is known regarding the link between inter-individual differences and embodiment.

The investigations of the doctoral thesis will focus on the effects of inter-individual differences on avatar perception and embodiment in immersive virtual environments via the adaptation of the embodied avatars based on each user's individuality. First studies underline the potential impact of some personality traits, such as self-esteem [Gorisse *et al.*, 2018] or locus of control [Dewez *et al.*, 2019], on the sense of embodiment and avatar perception in virtual reality. With the objective of offering each user a customized experience, we wish to pursue these investigations to identify the determining factors to improve the user-avatar relationship and provide developers with guidelines to adapt the content of virtual reality applications.

Laboratory:

The selected candidate will join the Presence & Innovation (P&I) research team of Arts et Métiers. P&I is a pluridisciplinary human-computer interaction team of researchers and engineers working in the field virtual and augmented reality. Two research axes are developed within the team: human-computer interaction in immersive virtual environments, and upstream phases of product and service design (ideation and innovation).

Profile:

Master's degree in computer science with extended knowledge of virtual reality.

We are looking for candidates with an interest in multidisciplinary research, at the frontier of virtual reality and experimental psychology. A strong interest for experimental research is required: production of protocols, conducting experiments, data analysis and writing. Applicants are expected to read, spoke and write academic English.

Technical skills:

- 3D engine extended knowledge (Unity).
- C# programming.
- Artistic (3D modeling, texturing) and technical skills (lighting and rendering) would be a plus.

Soft skills:

- Ability and discipline to work autonomously.
- Strong desire to take part in the activities of a multidisciplinary research and teaching team.

Application:

Applicants must send an academic resume (both french and english are welcome) along with a cover letter. We also encourage applicants to send a reference letter from a former supervisor. While additional skills and knowledge are welcome and will be considered, the application must emphasize the adequacy of the candidates' profile with the technical and scientific aspects of the proposed research project. Selected participants may request a tour of the laboratory and will be invited to attend an interview.

Additional information:

Expected date of beginning: November 2021

Duration: 36 months

Workplace: Arts et Métiers, Laval Virtual Center, 53810 Changé, France

Gross Salary: 1750 €

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