

Interaction with avatars in immersive virtual environments

Duration: 3 years

Teams: Loki (Inria – Lille Nord Europe, CRISTAL), Potioc (Inria – Bordeaux Sud Ouest, LaBRI)

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Description

Immersive virtual environments gained popularity in the past years although technical limitations used to degrade the immersion sensation and control capabilities. Recent VR headsets are promising technology to improve immersion thanks to better display resolution and head tracking accuracy. They are also shipped with input devices which provide multiple degrees of freedom for performing general purpose interaction tasks, e.g. 3D navigation. Overall, these technical improvements make it possible to study interaction in this kind of environment more effectively and finely.

This thesis is part of the Avatar project, which is a combined effort from several Inria teams, with complementary skills: HCI, VR, 3D interaction, Simulations, Image analysis and Image synthesis. The main application domain is immersive cinema, in collaboration with [Technicolor](#).

Our objective within this project is to design and study new interaction techniques and devices that are specifically dedicated to avatar-based interaction. These novel techniques may for example leverage touch interaction and haptic feedback to increase performance and enhance the control of avatars.

Description

The candidate's work will consist in:

- Studying related work on interaction techniques and devices for 3D immersive environments in general, and dedicated to avatars in particular.
- Identifying interaction tasks specifically related to avatars, and defining an appropriate design space.
- Designing and implementing interaction techniques and devices for 3D immersive environments.
- Designing evaluation protocols and run user studies to measure the benefits of the developed techniques.

Candidate

A successful candidate must hold a MSc in computer science or equivalent, and show a great interest in performing high quality research in Human-Computer Interaction. An experience with 3D programming (e.g. Unity3D) would be greatly appreciated. He or she must speak and write English fluently, and experience or strong interest in software and hardware development. Creativity, independence, team working and communication skills are valuable advantages.

Bibliography

[1] Argelaguet, F., Andujar, C. *A survey of 3D object selection techniques for virtual environments*. Computers and Graphics. 37, 3 (2013), 121–136.

[2] Grossman, T., Balakrishnan, R. *The design and evaluation of selection techniques for 3D volumetric displays*. UIST '06, 3–12.

[3] Mine, M., Yoganandan, A., Coffey, D. *Making vr work: Building a real-world immersive modeling application in the virtual world*. Proc. SUI '14, 80–89.