2019-02079 - Post-Doctoral Research Visit F/M Non-verbal communication and interactions: towards reactive and expressive virtual humans

Type de contrat : CDD de la fonction publique
Niveau de diplôme exigé : Thèse ou équivalent
Fonction : Post-Doctorant

A propos du centre ou de la direction fonctionnelle

Inria, the French national research institute for the digital sciences, promotes scientific excellence and technology transfer to maximise its impact. It employs 2,400 people. Its 200 agile project teams, generally with academic partners, involve more than 2,000 scientists in meeting the challenges of computer science and mathematics, often at the interface of other disciplines. Inria works with many companies and has assisted in the creation of over 160 startups. It strives to meet the challenges of the digital transformation of science, society and the economy.

Contexte et atouts du poste

The research center Inria Rennes - Bretagne Atlantique, established in 1980, is fully integrated into a rich and powerful regional ecosystem, boosting strong partnerships with the best actors of research and innovation in Brittany and Pays de Loire. It comprises 3 sites (Rennes, Nantes, Lannion), 730 people, 34 research teams, 6 ERC grant winners, 31 European projects, 9 startups.

This research topic will be carried out in Rennes, the capital of Brittany and the tenth largest city in France, with a metropolitan area of about 720,000 inhabitants. Moreover, with more than 66,000 students, Rennes is also the eighth-largest university campus of France and it has the 2nd highest concentration of digital and ICT firms in France after Paris. Rennes is also known to be one of the most festive and lively cities of France, home of several music and culture festivals. In 2018, the newspaper "L’Express" named Rennes as "the most liveable city in France".

Mission confiée

This post-doctoral position is framed under the REACTIVE project funded by the Brittany Region. It will be in close interaction with the EU H2020 ICT 25 PRESENT project. In this context, we aim at creating virtual digital companions -- embodied agents -- that look entirely naturalistic, demonstrate emotional sensitivity, can establish meaningful dialogue, add sense to the experience, and act as trustworthy guardians and guides in the interfaces for AR, VR and more traditional forms of media. There is no higher quality interaction than the human experience when we use all our senses together with language and cognition to understand our surroundings and, above all, to interact with other people. We interact with today’s “Intelligent Personal Assistants” primarily by voice. However, communication is episodic, based on a request-response model; the user does not see the assistant, which cannot take advantage of visual and emotional clues or evolve over time. Nonetheless, advances in the real-time creation of photorealistic computer-generated characters, coupled with emotion recognition and behaviour and natural language technologies, allow us to envisage virtual agents that are realistic in both looks and behaviour; that can interact with users through vision, sound, touch and movement as they navigate rich and complex environments; converse in a natural manner; respond to moods and emotional states; and evolve in response to user behaviour.

The post-doctoral candidate will join the Inria MimeTIC team (https://team.inria.fr/mimetic/), internationally recognized for its multidisciplinary approach to analyse, model and synthesize motion. The post-doctoral candidate will also have access to unique experimental platforms immersive and Immersimove which offer a high-tech set-up to perform user experiments in real and virtual environments and measure motion (motion capture, EMG, force plate, eye trackers).

Principales activités

The general objective is to create, in collaboration with computer scientists, interactive characters endowed with levels of behavioural sensitivity and responsiveness for Virtual Reality applications. By populating virtual environments with such characters, our goal is to achieve new levels of immersive experiences, by reinforcing the feeling of presence through non-verbal communication between a user and one or more agents.

A prerequisite for the creation of reactive and expressive virtual humans is to understand how "real" humans interact and react to the behaviours and reactions of others. This is the core of the REACTIVE project. It focuses on the elements of non-verbal communication resulting from body movements.

The main activities of the post-doctoral fellow will be:

- To establish a taxonomy of reactive and expressive behaviours during 1-to-1 interactions.
- To identify, through an approach involving movement Sciences, invariants within body reactions in situations of interaction between several people.
- To model these invariants, through an approach based on Digital Science, to create new animations of reactive and expressive virtual humans.
- To validate these models a posteriori by studying the user's interaction with these virtual humans thus created. This will validate that these manipulated invariants are well perceived.
by the user and important for interaction. We will propose both a subjective evaluation of
the realism perceived by the user but also a quantified evaluation of the interaction via
comparisons between the movements observed in real and virtual situations.

Competences
The candidate must have a PhD degree, with a preference in Human Movement Science. The
candidate should also be comfortable with as much following items as possible: Experience in motion
capture and movement analysis; Experience in carrying out users studies; Good knowledge of
programming tools (e.g., matlab) and statistics; Good spoken and written English; Good
communication skills. This post doctoral position is framed under a larger project, thus the candidate
will have to interact with other members of the project and assist to its meetings.

Avantages
- Subsidized meals
- Partial reimbursement of public transport costs

Rémunération
Monthly gross salary amounting to 2 653 euros