

2019-01750 - Post-Doctoral Research Visit F/M Personalising Virtual Character Motions for Crowd Animation

Contract type : Fixed-term contract
Level of qualifications required : PhD or equivalent
Fonction : Post-Doctoral Research Visit

About the research centre or Inria department

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 3,000 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.

Context

This research fellow position is funded by the ANR JJC Per² project (Perception-based Human Motion Personalisation), and the candidate will participate in the research conducted by the group working on Character Animation and Crowd Simulation.

Starting date: flexible, starting anytime from now

Duration: 18-month contract

Assignment

Context

The overall project targets the **personalisation of virtual human motions** which have become a requisite to create always more lifelike virtual worlds for industries ranging from entertainment to training and education. Although the visual realism of virtual human motions has drastically improved over the last decades, current animation techniques still create a certain uniformity of motion across characters. For single individuals (e.g., a main character), displaying the same generic motions for all users can limit their engagement, as motions are not personalised for any user. Similarly the absence of variation in large groups of individual also affects realism when they all move in the same manner. Tremendous amounts of manual artistic work can indeed create such variations, which undeniably improves overall realism (e.g., crowds in computer generated movies like Warcraft, Star Wars, The Hobbit), however it is still impossible to automatically create such levels of personalisation for interactive applications.

While this need for greater perceptual variety in virtual characters has been identified, existing approaches usually focus on variations of their visual aspect, i.e., appearance and shape [MLD*08,MLH*09]. However, motions are extremely important for humans to perform actions and to express themselves, in particular in nonverbal communication. Therefore, this project aims at creating variety in human motions, in order to create a new generation of more realistic virtual characters. However, variety is not simply a reflection of random differences, but results from complex intra-individual (e.g., fatigue) and inter-individual (e.g., morphology, age, sex, emotions) differences, which are seldom taken into account today in virtual characters. As such differences can be difficult to quantify, **this project focuses on how viewers perceive motion variations, to automatically produce natural motion personalisation accounting for inter-individual variations.** In short, our goal is to automate the creation of motion variations to represent given individuals according to their own characteristics, and to produce natural variations that are perceived and identified as such by users.

Main activities

Position

The candidate will therefore participate in the Per² project by exploring how virtual character motions can be personalised to meet the requirement of crowd animations. The main task of the candidate will be to explore how animation methods can be adapted to produce efficiently and realistically variations in the motions of large numbers of virtual characters, and to identify the best means of producing variations in such scenarios. In particular, one area to explore will be identifying through perceptual experiments how, when and where to add variations in the motions of groups of individuals. Then such insights will be used to design adaptive perception-based methods automatically providing the best trade-off between visual realism and

General Information

- **Theme/Domain :** Interaction and visualization
Software Experimental platforms (BAP E)
- **Town/city :** Rennes
- **Inria Center :** CRI Rennes - Bretagne Atlantique
- **Starting date :** 2020-03-01
- **Duration of contract :** 1 year, 6 months
- **Deadline to apply :** 2020-06-30

Contacts

- **Inria Team :** MIMETIC
- **Recruiter :**
Hoyet Ludovic / ludovic.hoyet@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Instruction to apply

Please submit online : your resume, cover letter and letters of recommendation eventually

Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

computation load, as we demonstrated that introducing variety in crowd animations motions contribute to the overall naturalness of virtual scenes [HOKP16].

The candidate will be part of the local group working on Character Animation and Crowd Simulation, and will participate in the supervision of the PhD students and interns involved on the related projects (including ANR JCJC Per2, EU H2020 ICT 25 CROWDBOT, EU H2020 ICT 25 PRESENT, EU H2020 ITN CLIPE).

Environment

The candidate will work in the MimeTIC team in the joined Inria / IRISA research centre located in Rennes. Inria (www.inria.fr) and IRISA (<http://www.irisa.fr/>) are amongst the leading research centres in Computer Sciences in France, and the MimeTIC team is internationally recognised in the fields of Computer Graphics and Virtual Human Simulation. Research activities in MimeTIC focus on simulating virtual humans that behave in a natural manner and act with natural motions.

Keywords and References

Virtual Characters, Human Motion, Crowd Animation, Perception

[HOKP16] Hoyet, A.-H. Olivier, R. Kulpa, J. Pettré. 2016. Perceptual Effect of Shoulder Motions on Crowd Animations. In ACM Transaction on Graphics (SIGGRAPH 2016), 35(4).

[MLD*08] R. McDonnell, M. Larkin, S. Dobbyn, S. Collins and C. O'Sullivan. Clone Attack! Perception of Crowd Variety. In ACM Transactions on Graphics (SIGGRAPH 2008), 27(3), 2008.

[MLH*09] R. McDonnell, M. Larkin, B. Hernandez, I. Rudomin and C. O'Sullivan. Eye-catching Crowds: Saliency based Selective Variation. In ACM Transactions on Graphics (SIGGRAPH 2009), 28(3), 2009.

Skills

Requirements for candidacy

The candidate must have a PhD degree in Computer Sciences, in the field of Computer Vision, Computer Graphics or Simulation. Beyond scientific excellence, we will consider candidates with excellent organization and communication skills.

Application

We are looking for motivated candidates, please send CV, a motivation letter, reference letters, and any relevant material to ludovic.hoyet@inria.fr, anne-helene.olivier@inria.fr and julien.pettre@inria.fr.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs

Remuneration

Monthly gross salary amounting to 2 653 euros