Inria

Offer #2019-01722

Post-Doctoral Research Visit F/M Postdoc in video-based crowd motion analysis

Contract type : Fixed-term contract

Renewable contract : Yes

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 postdoc position aims to participate in the development of new technologies to assist in the operational management of crowds during mass events using computers. During large gatherings, the density of people can become very high, creating a risk of turbulent crowd movements, shock wave propagation or trampling, and consequently, leading to vicitms by crushing or suffocation. The analysis and understanding of these phenomena is crucial to eventually enable better crowd management, and to provide technological solutions to assist public place managers in their operational management.

More specifically, this position aims to develop methods for analysing the global movement (macroscopic analysis) of the crowd filmed on video. The objective is to create a processing chain that includes video capture of crowd scenes, estimation of apparent movement in the image, calculation of the characteristics of this movement, extraction of relevant information for feedback and possible alerting of those responsible for the operational management of the site.

This position is available for a team of about ten people specialized in crowd analysis, modeling and simulation. This work is also carried out in close collaboration with industrial partners in the field of crowd simulation for the design and management of public places. Finally, this work includes an important experimental part. We aimed to implement the technologies developed during events such as music festivals or in high-traffic areas.

Assignment

In this position:

- You are in charge of developing macroscopic methods for analyzing crowd movement, based mainly on a modal analysis of apparent movement [1]. A direction envisaged and to extend this analysis in space-time space (limited to space to date).
- You are in charge of a scientific watch on the field of operational crowd management, on methods of measuring and analyzing crowd activity, and on crowd management assistance technologies.
- You are in charge of planning and carrying out the experiments necessary for the evaluation and empirical validation of the methods developed, in close collaboration with public place managers and mass event managers.

[1] **A. Bottinelli**, D.J.T. Sumpter, and J.L. Silverberg, "Emergent Structural Mechanisms for High-Density Collective Motion Inspired by Human Crowds", *Physical Review Letters*, 117, 228301, (2016).

Main activities

In this position

- You coordinate the IT development of solutions that implement crowd motion analysis. You maintain an operational version of the video processing chain. You coordinate field experiments.
- You disseminate your results to the scientific community (publications, journals and scientific conferences). You are also involved in a scientific popularization effort aimed at the general public.

You participate in making your technological results available to the public.
- You work with local team members to integrate the analytical methods developed as part of the broader crowd modeling and simulation process. You will explore relevant internal collaborations.
- You collaborate with our industrial partners to consider the industrial transfer of your solutions.
- You participate in the supervision of students who share the same objective of crowd movement analysis.

Skills

Technical skills and level required : PhD in Computer Science or Computer Vision

Languages : english

Other valued appreciated : scientific dissemination

Benefits package

- Subsidised catering service
- Partially-reimbursed public transport

Remuneration

- monthly gross salary amounting to 2653 euros

General Information

- **Theme/Domain :** Data and Knowledge Representation and Processing
  Scientific computing (BAP E)
- **Town/city :** Rennes
- **Inria Center :** Centre Inria de l'Université de Rennes
- **Starting date :** 2019-09-01
- **Duration of contract :** 2 years, 1 month
- **Deadline to apply :** 2019-06-30

Contacts

- **Inria Team :** RAINBOW
- **Recruiter :**
  Pettre Julien / julien.pettre@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.

The keys to success

Our expectations for candidates for this position are:

- A very high competence in software development, in particular computer vision technologies, visual scene interpretation, time series analysis
- A possible double competence in one field among: the physics of granular materials, experimental psychology, crowd simulation. Mentioning any other appetite for another scientific field is essential on this cross-cutting subject.
- Appetence for empirical approaches and experimental validation. A pronounced taste for music festivals!
- Good communication and collaboration skills will be an asset for a good integration into our team.

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.

Instruction to apply

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

For more information, please contact julien.pettre@inria.fr

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.

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