



Offer #2021-03686

PhD Position F/M Learning Non-rigid Surface Matching

Level of qualifications required : Graduate degree or equivalent

Fonction : PhD Position

About the research centre or Inria department

Grenoble Rhône-Alpes Research Center groups together a few less than 650 people in 37 research teams and 8 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Context

The Ph.D. will take place within the Morpheo research team at Inria Grenoble Rhône-Alpes. The team deals with the capture and analysis of dynamic scenes from multi-camera studios, and operates its own 68 camera acquisition platform and cluster, <http://kinovis.inrialpes.fr>.

The PhD topic is on surface matching which is the process of finding correspondences between shape surfaces. Of particular interest within the Morpheo context is the application of surface matching to 3D human reconstructions with different body poses and dynamic clothing as captured along time in dynamic mesh sequences. The objective is to achieve 4D temporally coherent meshes across complex dynamic scenes, e.g., mesh connectivity does not vary from frame-to-frame. The PhD will investigate learning based strategies for that purpose.

Assignment

The focus of this Ph.D. is on matching unstructured surfaces from human performance capture systems, improving on traditional approaches using novel sophisticated learning-based techniques. Learning-based techniques appear with considerable interest in shape analyses and representation. Although most recent methods rely on statistical body models, which can lack on realistic surface deformations, in particular on clothing deformations. The direction of this research is towards enabling deep learning methods to efficiently represent non-rigid features, such as loose clothing and hair motion, consequently, facilitating matching of complex dynamic performance capture content.

Main activities

The purpose of this Ph.D. is therefore to investigate innovative solutions on mesh matching that allow representation of non-rigid dynamic mesh sequences leverage by recent deep learning strategies that can take benefit of existing body shape datasets to learn non-rigid mesh correspondences.

Skills

Technical skills and level required :

- Solid Background in 3D Vision, Machine Learning and knowledge in Computer Animation.
- Solid programming skills, e.g. C++ and python.
- Solid mathematical knowledge in linear algebra and statistics.

Languages : English mandatory, French optional.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (90 days / year) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

1st and 2nd year: 1 982 euros gross salary / month

3rd year: 2 085 euros gross salary / month

General Information

- **Theme/Domain** : Vision, perception and multimedia interpretation
Scientific computing (BAP E)
- **Town/city** : Montbonnot
- **Inria Center** : [Centre Inria de l'Université Grenoble Alpes](#)
- **Starting date** : 2021-09-01
- **Duration of contract** : 3 years
- **Deadline to apply** : 2021-08-15

Contacts

- **Inria Team** : [MORPHEO](#)
- **PhD Supervisor** :
Boyer Edmond / edmond.boyer@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.

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

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.