2018-00788 - Learning Morphologically Plausible Pose Transfer

Renewable contract: Oui
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 800 people in 35 research teams and 9 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 PhD is part of the AVATAR INRIA project, a collaborative project between several INRIA teams with the aim to significantly advance the field of AVATAR modeling in particular by improving their realism. The PhD will be shared between the Mimetic team in Rennes, specialized in animation and the Morphee team in Grenoble, specialized in moving shape capture.

Assignment
One of the objective of AVATAR is the ability to transfer the motion captured from a user to its avatar in a faithful way. A key aspect in this process is the ability to preserve incidence relationships, e.g. contacts between body parts or with the environment, when animating avatars. As a result, a body pose should not, in practice, be limited to the traditional joint angle that model mainly the internal or anatomical pose but should also account for external contextual information, such as relationships in-between body surface points or with the environment. This is especially true with contacts between body parts that cannot be captured with joint angles only. In order to better model human pose, a set of works consider the “interaction mesh” [Ho10, Bernardin16], a graph structure that connects joint centers and can be used to preserve distances between these centers when transferring body poses to an avatar. Interaction graphs aim at capturing the contextual information linked to the motion. However, while better preserving the interaction between body parts, the interaction mesh is still unable to accurately capture and transfer body surface information. The purpose of this PhD is therefore to investigate innovative solutions that encode both internal and external shape poses as well as recent deep learning strategies that can take benefit of existing body shape datasets to learn pose transfers.

Skills
- Solid programming skills and experience with CNNs
- Solid mathematical background, especially in geometry, linear algebra, statistics
- Language requirements: fluent spoken English or French, and fluent written English
- Prior knowledge in the areas of machine learning, computer vision, computer graphics or computational geometry is a plus

Benefits package
**General Information**

- **Theme/Domain**: Vision, perception and multimedia interpretation
  - Software engineering (BAP E)
- **Town/city**: Montbonnot
- **Inria Center**: CRI Grenoble - Rhône-Alpes
- **Starting date**: 2018-09-01
- **Duration of contract**: 3 years
- **Deadline to apply**: 2018-08-15

**Contacts**

- **Inria Team**: MORPHEO
- **Recruiter**: Boyer Edmond / edmond.boyer@inria.fr

**The keys to success**

Informal inquires can be addressed to franck.multon@irisa.fr and edmond.boyer@inria.fr. Please upload your application, quoting the PhD subject, on the team website: [http://morpheo.inrialpes.fr/job-applications](http://morpheo.inrialpes.fr/job-applications).

**About Inria**

Inria, the French National Institute for computer science and applied mathematics, promotes “scientific excellence for technology transfer and society”. Graduates from the world’s top universities, Inria’s 2,700 employees rise to the challenges of digital sciences. With its open, agile model, Inria is able to explore original approaches with its partners in industry and academia and provide an efficient response to the multidisciplinary and application challenges of the digital transformation. Inria is the source of many innovations that add value and create jobs.

**Conditions for application**

**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.