2018-00788 - Learning Morphologically Plausible Pose Transfer

Renewable contract: Oui
Level of qualifications required: Graduate degree or equivalent
Function: 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 Morphoe 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” (Holzmann, Bernardini16), 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 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

- Subsidized catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration

1982€ the first 2 years, then 2085€ the third year.