A propos du centre ou de la direction fonctionnelle

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.

Contexte et atouts du poste

This position is part of an Associate team with the LTS4 at EPFL. Yes, some travels to Lausanne are foreseen for this project and teh travel expenses are covered by the associate team.

Mission confiée

Supervisors:
- At Inria: Thomas MAUGEY (thomas.maugey@inria.fr), Aline ROUMY (aline.roumy@inria.fr)
- At EPFL: Pascal FROSSARD (pascal.frossard@epfl.ch)

- The goal of the project is to develop the mathematical and algorithmic tools for an efficient representation and compression of 360° images in the spherical domain.

International collaboration
The project will be developed in collaboration with Pascal Frossard, EPFL, in the context of the Associate Team "GOP".

Candidate Profile

- The candidate should have a strong background in signal processing, information theory, notions of learning and graph theory would be appreciated, interest in programming.
- How to apply: Each application should consist of a CV, a letter of introduction, and a copy of the student’s university transcripts.

Principales activités

Contexte: Omnidirectional (or 360°) images has become popular in the recent years, with many applications such as robotic, virtual reality, 3D reconstruction, etc. The 360° image describes the information coming from any direction towards the camera center. It is naturally represented as pixels distributed on a unit sphere, whose positions are parametrized by two angles. However, in order to be compressed, an intermediary representation is usually adopted, namely a mapping of the sphere into a 2D planar image. This is motivated by the fact that 2D image processing tools are numerous and benefit from decades of research. This strategy might nevertheless be inefficient since the mapping also introduce radial distortion. The aim of the project is to compress the spherical image directly, avoiding the 2D projection.

Envisaged Approach: Processing data directly on the sphere implies to develop specific tools that are compatible with non cartesian domain. For that purpose, we will rely on graph-based representation and construct new tools taking into account the spherical topology as long as the statistical dependencies of the representation and construct new tools taking into account the spherical topology as long as the statistical dependencies of the 360° content. For that purpose, we will design learning strategies to find transforms, predictions, or other graph-based processing tools to efficiently compress the omnidirectional data.

Bibliography


Compétences
Technical skills and level required:

Languages:

Relational skills:

Other valued appreciated:

Avantages
- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Rémunération
Monthly gross salary amounting to 2653 euros.