2018-00633 - Development of a video light field compression tool

**Type de contrat:** CDD de la fonction publique  
**Contrat renouvelable:** Oui  
**Niveau de diplôme exigé:** Bac + 5 ou équivalent  
**Autre diplôme apprécié:** Ou Thèse  
**Fonction:** Ingénieur scientifique contractuel  
**Niveau d’expérience souhaité:** Jusqu’à 3 ans

**A propos du centre ou de la direction fonctionnelle**

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.

**Team presentation**

Efficient processing, i.e. analysis, storage, access and transmission of visual content, with continuously increasing raw data rates, in environments which are more and more mobile and distributed, remains a key challenge of the years to come. The emergence of new image modalities leads to a sustained need for algorithmic tools allowing efficient compression and communication of large volumes of visual data, of visual features and descriptors extracted for different video processing tasks.

The goal of the project-team is the design of algorithms and practical solutions in the areas of visual data analysis, modeling, representation, compression and communication. Our activities are thus structured around the following inter-dependent axes:

- Analysis and modeling for compact representation and navigation in large volumes of visual data
- Representation and compression of visual data
- Distributed processing and robust communication of visual data

The proposed research is at the frontier of computer vision, signal processing, coding and information theory. In terms of application domains, the project will primarily target networked visual data analysis, modeling, representation, compression and communication. Our activities are thus structured around the following inter-dependent axes:

- Analysis and modeling for compact representation and navigation in large volumes of visual data
- Representation and compression of visual data
- Distributed processing and robust communication of visual data

The position is funded by the ERC advanced grant project CLIM: Computational Light Fields Imaging.

**Mission confiée**

Light fields are densely sampled high-dimensional signals containing information about the light rays interacting with the physical objects in the scene. They yield a very rich description of a 3D scene which enables advanced creation of novel images from a single capture [1][2]. However, if we want the light field technology to be as widely used as classical imaging and video systems, it is necessary to offer the users the possibility to edit and manipulate light fields as it is quite common with 2D images and videos.

The goal of the engineer position will be to develop a video light field compression architecture that will integrate the following steps: scene depth estimation, view synthesis, scene flow estimation, over-segmentation to find the support of local models, local transforms and coding tools. Algorithms for the different steps [3-5] have been proposed in the team and a first validation has been carried out via a matlab implementation. After having designed in the coder and decoder architecture, the work will consist in re-writing these algorithms in c/c++ while proposing possible algorithmic optimizations. The solution is intended, via possible options and optimizations, to be usable both for α...
dense and sparse light fields. The codec (coder/decoder) may be eventually integrated as a plug-in within a light field editing tool.

References