**Workshop EPFL-Inria
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Title: « Graph-based compression of omnidirectional images »

Abstract:

In the last years, we have observed a great popularization of omnidirectional cameras and the development of applications that enable users to watch 360 videos online, on their smartphone, tablet or Virtual Reality glasses. A 360 video captured by an omnidirectional camera, describes a scene from a given position in all the possible directions. The specificity of the acquired video is that pixels are lying on a sphere, which makes the compression tools adopted in the existing codecs inefficient. The development of an efficient 360° video is essential to circumvent the data size explosion. Some coding tools have been proposed in the literature, but they present two main limitations. First, they do not exploit the inherent geometrical structure between the pixels. Second, they have not explored the multi-view compression of 360 cameras, whereas it presents a great interest, for free viewpoint applications for example. The processing and the compression of 360 multi-view videos were tackled in this project GOP, by exploiting the geometry (intra- and inter-views) relations between the pixels.
More precisely, a graph was defined, in which the pixels are the vertices and their neighborhood in the 3D space is represented by edges. We were then able to develop fundamental results in Graph Signal Processing with hypothesis that differ from the one usually assumed in the literature. In our case, the graph is fixed (based on geometry rules), and the purpose is to find efficient transform and coding tools for the compression of pixels lying on this irregular structure. The main scientific goal of the project were to investigate new tools for the representation and the coding of omnidirectional videos.

Bio:

Thomas Maugey graduated from Ecole Supérieure d'Electricité, Supélec, Gif-sur-Yvette, France in 2007.He received the M.Sc. degree in fundamental and applied mathematics from Supélec and Université PaulVerlaine, Metz, France, in 2007. He received hi Ph.D.degree in Image and Signal Processing at TELECOM ParisTech, Paris, France in 2010. From October 2010 to October 2014, he was a postdoctoral researcher at the Signal Processing Laboratory (LTS4) of Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland. Since November 2014, he is a Research Scientist at Inria Rennes-Bretagne-Atlantique. His research deals with immersive video compression.