Workshop on "When Graph Signal Processing meets Computer Vision" at ICCV 2021

(https://gsp-cv.univ-lr.fr/gspcv-21/)

Graph signal processing (GSP) [is the study of computational tools to process and analyze data residing on irregular correlation structures described by graphs. Early GSP researchers explored low-dimensional representations of high-dimensional data via spectral graph theory---mathematical analysis of eigen-structures of the adjacency and graph Laplacian matrices. Researchers first developed algorithms for low-level tasks such as signal compression, wavelet decomposition, filter banks on graphs, regression, and denoising, motivated by data collected from distributed sensor networks. Soon, researchers widened their scope and studied GSP techniques for image applications (image filtering, segmentation) and computer graphics.. More recently, GSP tools were extended to video processing tasks such as moving object segmentation, demonstrating its potential in a wide range of computer vision problems. More generally, GSP has been found effective in image processing tasks (image restoration and denoising, image composition, image alignment and rectification, multi-focus image fusion, etc), video processing tasks (tracking, motion saliency, video coding, background/foreground separation, etc.), and 3D imaging tasks (point cloud processing, 3D motion recovery, etc). Moreover, GSP can potentially influence the development of Graph Convolutional Networks from a theoretical standpoint.

However, designing GSP algorithms for specific computer vision tasks has several practical challenges such as spatio-temporal constraints, time-varying models and real-time implementations. Indeed, the computational complexity of many existing GSP algorithms at present for very large graphs is currently one limitation. In semi-supervised learning, GSP-based classifiers provide clear interpretations from a graph spectral perspective when propagating label information from known to unknown nodes. However, centralized graph spectral algorithms are slow and no fast distributed graph labeling algorithms are known to perform well. In that sense, research is required in the development of fast GSP tools to be competitive against deep learning methods.

The goals of this workshop are thus three-fold: 1) designing GSP methods for computer vision applications; 2) proposing new adaptive and incremental algorithms that reach the requirements of real-time applications; and 3) proposing robust and interpretable algorithms to handle the key challenges in computer vision applications.

Papers are solicited to address graph signal processing to be applied in computer vision, including but not limited to the followings:

Sampling and Recovery of Graph Signals	Graph-based Segmentation and Classification
Statistical Graph Signal Processing	Graph-based Image and Video Processing
Non-linear Graph Signal Processing	Graph Convolutional Networks.(GNNs)
Signals in high-order Graphs	Interpretable/Explainable GNNs
Graph-based Image Restoration	Unsupervised/Self-Supervised GNNs
Graph-based Image Filtering	GSP-based Graph Learning in GNNs

Timeline

Full Paper Submission Deadline: July 13, 2021 (for papers not submitted at ICCV) July 25, 2021 (for papers that are awaiting for ICCV decisions)

Decisions to Authors: July 31, 2021

Camera-ready Deadline: August 17, 2021

Selected papers, after extensions and further revisions, will be published in a special issue in an international journal.