Special Session 14: Graph spectral processing of 3D point cloud data

Graph signal processing (GSP) is the study of discrete signals that reside on combinatorial graphs and uses graph spectral analysis to decompose signals into graph frequency components. It is a rapidly-developing field in signal/image processing. GSP has attracted attention in the machine learning community also, where it is used as a key tool for deep learning on manifolds/graphs. Recently, 3D geometry of physical objects can be captured economically using off-the-shelf sensors, where one popular representation is 3D point cloud. Because of the imperfect sensing process, acquired point clouds, which are often non-uniform discrete samples in space, tend to be noisy, have missing data and/or in lower resolution than desired. Further, the typical size of a point cloud can be very large. Thus compression / processing of 3D point clouds is a difficult task, and recently graph spectral methods have been proposed as a new line of attack, leveraging on the aforementioned progress in GSP. In this special session, we gather researchers from a wide spectrum of research disciplines--signal processing, computational vision, computer graphics and machine learning--to study the processing of 3D point clouds using GSP techniques for applications ranging from compression, noise reduction to point cloud classification.

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