Special Issue on Adaptive Sparse Representation of Data and Applications in Signal and Image Processing

The complex structures of natural signals and images require adaptive tools in order to make use of their intricate redundancies. To capture this complexity, we have witnessed a flurry of research activities where researchers spanning a diverse range of viewpoints have advocated the use of sparsity and overcomplete signal/image representations. It has turned out that exploiting sparsity and overcompletness offers striking benefits in a wide range of signal/image processing. These generic methods however have limitations in terms of computational efficiency or theoretical ability to extract specific patterns. Indeed, complex signals such as turbulent textures, geometrical astronomical data or audio signals can be unsatisfactorily represented in current fixed redundant dictionaries. Thus, choosing an appropriate dictionary is a key step towards an efficient sparse representation. A core idea here is the adaptivity of the transforms to the morphological content of data.

This special issue is a call to gather a broad range of methods, algorithms and theoretical results in the area of sparse adaptive approximation. The retained papers will present original works or review state-of-the-art approaches that unlock the bottlenecks of sparse adaptive approximation. Original contributions are solicited from the following non-exhaustive list of topics:

- Orthogonal and redundant frames adapted to the non-linear, multiscale and geometrical structure of signals and images.
- Adaptive representations based on lifting or non-stationary subdivision schemes.
- Data-driven approximations based on the learning of adapted dictionaries.
- Theoretical breakthroughs to assess the sparsity of representations or to ensure the recovery of signals.
- Resolution of inverse problems such as denoising, deconvolution or inpainting where adaptivity is crucial.
- Resolution of sparse recovery problems such as compressed/ive sensing or blind source separation where adaptivity could improve over the state of the art.
- Sparse approximation of non traditional data such as multi-channel signals or manifold-valued function.
- Modeling of natural signals and images based on adaptive sparse representation.
- Applications in biomedical imaging, astronomical imaging, audio signal processing, etc

Prospective authors should visit : http://www.signalprocessingsociety.org/publications/periodicals/jstsp/ for information on paper submission. Manuscripts should be submitted using the Manuscript Central system at http://mc.manuscriptcentral.com/jstsp-ieee. Manuscripts will be peer reviewed according to the standard IEEE process.

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Lead guest editor:
  Dr. Jean-Luc Starck, Service d'Astrophysique CEA/Saclay France, jstarck@cea.fr
Guest editors:
  Dr. Jalal Fadili, GREYC CNRS Caen, Jalal.Fadili@greyc.ensicaen.fr
  Dr. Michael Elad, Technion, elad@cs.technion.ac.il
  Dr. Robert Nowak, University of Wisconsin-Madison , USA, nowak@ece.wisc.edu
  Dr. Panagiotis Tsakalides, University of Crete and FORTH-ICS, Greece, tsakalid@ics.forth.gr