

SPECIAL ISSUE

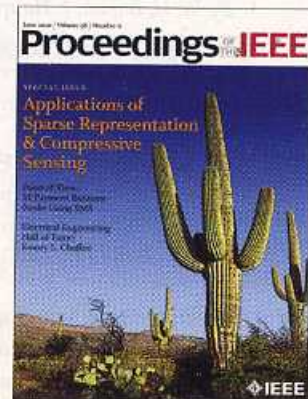
APPLICATIONS OF SPARSE REPRESENTATION & COMPRESSIVE SENSING

Edited by R. G. Baraniuk, E. Candès, M. Elad, and Y. Ma

- 913 Precise Undersampling Theorems**
By *D. L. Donoho and J. Tanner*
| INVITED PAPER | This paper develops the concept that, in many situations, such as heart imaging, practical results can be achieved with a very small number of images.
- 925 Matrix Completion With Noise**
By *E. J. Candès and Y. Plan*
| INVITED PAPER | Predictions about the choices of those who may take part in choosing such items as movies for rent can be accurately made with a relatively small number of examples.
- 937 Sparse Recovery Using Sparse Matrices**
By *A. Gilbert and P. Indyk*
| INVITED PAPER | Significant results in predicting the operation of equipment such as network routers, or the results of group testing for defective items, can often be obtained from a few samples.
- 948 Computational Methods for Sparse Solution of Linear Inverse Problems**
By *J. A. Tropp and S. J. Wright*
| INVITED PAPER | In many engineering areas, such as signal processing, practical results can be obtained by identifying approaches that yield the greatest quality improvement, or by selecting the most suitable computation methods.
- 959 Low-Dimensional Models for Dimensionality Reduction and Signal Recovery: A Geometric Perspective**
By *R. G. Baraniuk, V. Cevher, and M. B. Wakin*
| INVITED PAPER | There are many signal techniques that can be used to perform data acquisition, analysis or processing more efficiently and accurately than can be done by most random signal processors.
- 972 On the Role of Sparse and Redundant Representations in Image Processing**
By *M. Elad, M. A. T. Figueiredo, and Y. Ma*
| INVITED PAPER | In image processing, filling in missing portions of images or clearing up blurred images can be rapid, efficient, accurate, and relatively simple procedures.
- 983 Image Decomposition and Separation Using Sparse Representations: An Overview**
By *M. J. Fadili, J.-L. Starck, J. Bobin, and Y. Moudden*
| INVITED PAPER | This overview paper points out that signal and image processing, as well as many other important areas of engineering, can benefit from the techniques it discusses.

DEPARTMENTS

- 903 POINT OF VIEW**
M-Payment Between Banks Using SMS
By *P. Soni*
- 906 SCANNING THE ISSUE**
Applications of Sparse Representation and Compressive Sensing
By *R. G. Baraniuk, E. Candès, M. Elad, and Y. Ma*
- 910 SCANNING THE TECHNOLOGY**
Scanning the Technology
By *D. Donoho*
- 1102 SCANNING OUR PAST**
Electrical Engineering Hall of Fame:
Emory L. Chaffee
By *J. E. Brittain*
- 1105 FUTURE SPECIAL ISSUES/SPECIAL SECTIONS**



On the Cover: Our cover desert scene, aside from being a pleasant vista, illustrates the concept of Sparse Representation in the sense that a few isolated cactus plants represent the desert landscape similar to partial signal segments that represent complete signal information in Sparse Representation.

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SPECIAL ISSUE: APPLICATIONS OF SPARSE REPRESENTATION & COMPRESSIVE SENSING

- 995 Sparse Representations in Audio and Music: From Coding to Source Separation**
By *M. D. Plumbley, T. Blumensath, L. Daudet, R. Gribonval, and M. E. Davies*
| INVITED PAPER | The fidelity of music and other audio can usually be accurately and rapidly predicted from a relatively small sample of signal information.
- 1006 Sparsity and Compressed Sensing in Radar Imaging**
By *L. C. Potter, E. Ertin, J. T. Parker, and M. Çetin*
| INVITED PAPER | The success and accuracy of remote sensing with Radar can be predicted from reasonably limited samples of Radar signals.
- 1021 Astronomical Data Analysis and Sparsity: From Wavelets to Compressed Sensing**
By *J.-L. Starck and J. Bobin*
| INVITED PAPER | Correct interpretation of astronomical images can usually be achieved by examining and analyzing a relatively small sample of those images.
- 1031 Sparse Representation for Computer Vision and Pattern Recognition**
By *J. Wright, Y. Ma, J. Mairal, G. Sapiro, T. S. Huang, and S. Yan*
| INVITED PAPER | A relatively small sample of computer vision and pattern recognition information in applications such as face recognition is often sufficient to reveal the meaning the user desires.
- 1045 Dictionaries for Sparse Representation Modeling**
By *R. Rubinstein, A. M. Bruckstein, and M. Elad*
| INVITED PAPER | Digital sampling can display signals, and it should be possible to expose a large part of the desired signal information with only a limited signal sample.
- 1058 Compressed Channel Sensing: A New Approach to Estimating Sparse Multipath Channels**
By *W. U. Bajwa, J. Haupt, A. M. Sayeed, and R. Nowak*
| INVITED PAPER | High-rate wireless data communication can usually be achieved by collecting a relatively small sample of the available information about the communications channel.
- 1077 Distributed Sensor Perception via Sparse Representation**
By *A. Y. Yang, M. Gastpar, R. Bajcsy, and S. S. Sastry*
| INVITED PAPER | Improving the performance of wireless sensor networks can be accomplished by using more efficient algorithms to analyze the networks.
- 1089 Compressive Sensing on a CMOS Separable-Transform Image Sensor**
By *R. Robucci, J. D. Gray, L. K. Chiu, J. Romberg, and P. Hasler*
| INVITED PAPER | By compressing images before they are converted to digital format, this image sensor device can use analog computation to achieve much higher resolution at lower cost.

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