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This issue's "Reader's Choice" contains a list of articles published by the IEEE Signal Processing Society (SPS) that ranked among the top 100 most downloaded IEEE *Xplore* articles from July to December 2009. The highest rank obtained by an article in this time frame is indicated in bold. Your suggestions and comments are welcome and should be sent to Associate Editor Berna Erol (berna_erol@yahoo.com).

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TITLE, AUTHOR, PUBLICATION YEAR IEEE SPS JOURNALS	ABSTRACT	RANK IN IEEE TOP 100 (DEC–JUL 2009)						*N* TIMES IN TOP 100 SINCE JAN 2006
		DEC	NOV	OCT	SEP	AUG	JUL	
AN INTRODUCTION TO COMPRESSIVE SAMPLING Candes, E.J.; Wakin, M.B. *IEEE Signal Processing Magazine,* vol. 25, no. 2, Mar. 2008, pp. 21–30	This article surveys the theory of compressive sampling, also known as compressed sensing or CS, a novel sensing/sampling paradigm that goes against the common wisdom in data acquisition.	21	18	34	**16**	61	35	20
IMAGE INFORMATION AND VISUAL QUALITY Sheikh, H.R.; Bovik, A.C. *IEEE Transactions on Image Processing,* vol. 15, no. 2, Feb. 2006, pp. 430–444	This paper proposes to quantify the loss of image information to the distortion process and explore the relationship between image information and visual quality.	**28**						1
BLIND AND SEMI-BLIND DEBLURRING OF NATURAL IMAGES Almeida, M. S. C.; Almeida, L. B. *IEEE Transactions on Image Processing*, vol. 19, no. 1, Jan. 2010, pp. 36–52	This paper presents a blind image deblurring method that makes weak assumptions about the blurring filter and is able to undo a wide variety of blurring degradations.	**42**						1
A SPATIAL CORRELATION MODEL FOR VISUAL INFORMATION IN WIRELESS MULTIMEDIA SENSOR NETWORKS Rui Dai; Akyildiz, I.F. *IEEE Transactions on Multimedia*, vol. 11, no. 6, Oct. 2009, pp. 1148–1159	This paper proposes a novel spatial correlation model for WMSNs, which can model the correlation characteristics of visual information with low computation and communication costs.	**58**						1
CLUSTERING ALGORITHM IN INITIALIZATION OF MULTI-HOP WIRELESS SENSOR NETWORKS Guo. P.; Jiang, T.; Zhang, K.; Chen, H.-H. *IEEE Transactions on Wireless Communications,* vol. 8, no. 12, Dec. 2009, pp. 5713–5717	This paper addresses the clustering problem with a newly deployed multihop WSN where most existing clustering algorithms can hardly be used due to the absence of MAC link connections among the nodes.	**74**						1
FACE RECOGNITION UNDER VARYING ILLUMINATION USING GRADIENT FACES Zhang, T.; Tang, Y.Y.; Fang, B.; Shang, Z.; Liu, X. *IEEE Transactions on Image Processing*, vol. 18, no. 11, Nov. 2009, pp. 2599–2606	This paper proposes a novel method to extract illumination insensitive features for face recognition under varying lighting called the gradient faces.	80	62	**56**				3

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		DEC	NOV	OCT	SEP	AUG	JUL	
PRINCIPAL NEIGHBORHOOD DICTIONARIES FOR NONLOCAL MEANS IMAGE DENOISING Tasdizen, T. *IEEE Transactions on Image Processing,* vol. 18, no. 12, Dec. 2009, pp. 2649–2660	This paper presents an in-depth analysis of a variation of the nonlocal means (NLM) image denoising algorithm that uses PCA to achieve a higher accuracy while reducing computational load.	83	**3**					2
A TUTORIAL ON PARTICLE FILTERS FOR ONLINE NONLINEAR/NON-GAUSSIAN BAYESIAN TRACKING Arulampalam, M.S.; Maskell, S.; Gordon, N.; Clapp, T. *IEEE Transactions on Signal Processing*, vol. 50, no. 2, Feb. 2002, pp. 174–188	This paper reviews both optimal and suboptimal Bayesian algorithms for nonlinear/non-Gaussian tracking problems, with a focus on particle filters.	85			67	60	**44**	39
BAYESIAN COMPRESSIVE SENSING USING LAPLACE PRIORS Babacan, S. D.; Molina, R.; Katsaggelos, A. K. *IEEE Transactions on Image Processing,* vol. 19, no. 1, Jan. 2010, pp. 53–63	This paper models the components of the compressive sensing problem, i.e., the signal acquisition process, the unknown signal coefficients and the model parameters for the signal and noise using the Bayesian framework.	**94**						1
OPTIMAL SYMBOL TIMING FOR OFDM WIRELESS COMMUNICATIONS Wang, M.M.; Lei, X.; Brown, T.; Min, D. *IEEE Transactions on Wireless Communications,* vol. 8, no. 10, Oct. 2009, pp. 5328–5337	This paper derives an optimal OFDM symbol timing solution in the sense of maximizing the signal to interference ratio (SIR) of the collected OFDM symbol and proposes a practical timing algorithm.	**96**						1
FROM LAGRANGE TO SHANNON ... AND BACK: ANOTHER LOOK AT SAMPLING Prandoni, P.; Vetterli, M. *IEEE Signal Processing Magazine,* vol. 26, no. 5, Sep. 2009, pp. 138–144	This article examines the interplay between analog and digital signals, casting discrete-time sequences in the lead role, with continuous-time signals entering the scene as a derived version of their gap-toothed archetypes.		37	25	**2**			3
A SURVEY OF MULTICORE PROCESSORS Blake, G.; Dreslinski, R.G.; Mudge, T. *IEEE Signal Processing Magazine,* vol. 26, no. 6, Nov. 2009, pp. 26–37	This article covers some of the attributes common to all multicore processor implementations and illustrates these attributes with current and future commercial multicore designs.		**39**					1
COMPLEX WAVELET STRUCTURAL SIMILARITY: A NEW IMAGE SIMILARITY INDEX Sampat, M.P.; Wang, Z.; Gupta, S.; Bovik, A.C.; Markey, M.K. *IEEE Transactions on Image Processing,* vol. 18, no. 11, Nov. 2009, pp. 2385–2401	The article introduces a new measure of image similarity that is called the complex wavelet structural similarity (CW-SSIM) index and shows its applicability as a general purpose image similarity index.		41	**7**				2
OCTAHEDRAL TRANSFORMS FOR 3-D IMAGE PROCESSING Lenz, R.; Carmona, P.L. *IEEE Transactions on Image Processing,* vol. 18, no. 12, Dec. 2009, pp. 2618–2628	This paper shows how thresholding in the transform domain can be used in 3-D signal processing.		**46**					1
A HISTOGRAM MODIFICATION FRAMEWORK AND ITS APPLICATION FOR IMAGE CONTRAST ENHANCEMENT Arici, T.; Dikbas, S.; Altunbasak, Y. *IEEE Transactions on Image Processing*, vol. 18, no. 9, Sep. 2009, pp. 1921–1935	The paper presents a general framework based on histogram equalization for image contrast enhancement, where contrast enhancement is posed as an optimization problem that minimizes a cost function.		51	15	14	**4**		4

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FAST GRADIENT-BASED ALGORITHMS FOR CONSTRAINED TOTAL VARIATION IMAGE DENOISING AND DEBLURRING PROBLEMS Beck, A.; Teboulle, M. *IEEE Transactions on Image Processing,* vol. 18, no. 11, Nov. 2009, pp. 2419–2434	This paper studies gradient-based schemes for image denoising and deblurring problems based on the discretized total variation (TV) minimization model with constraints.		65	**16**				2
MATCHING PURSUITS WITH TIME-FREQUENCY DICTIONARIES Mallat, S.G.; Zhang, Z. *IEEE Transactions on Signal Processing*, vol. 41, no. 12, Dec. 1993, pp. 3397–3415	This paper introduces an algorithm, called matching pursuit, that decomposes any signal into a linear expansion of waveforms that are selected from a redundant dictionary of functions.		**80**					1
ACTIVE CONTOURS WITHOUT EDGES Chan, T.F.; Vese, L.A. *IEEE Transactions on Image Processing,* vol. 10, no. 2, Feb. 2001, pp. 266–277	This paper proposes a new model for active contours to detect objects in a given image, based on techniques of curve evolution, Mumford-Shah functional for segmentation and level sets.		**82**				100	8
HOW THE HOUGH TRANSFORM WAS INVENTED Hart, P.E. *IEEE Signal Processing Magazine,* vol. 26, no. 6, Nov. 2009, pp. 18–22	This article explains how Hough's initial idea combined with an idea from an obscure branch of late 19th century mathematics to produce the familiar sinusoidal transform.		**95**					1
TRENDS IN MULTICORE DSP PLATFORMS Karam, L.J.; AlKamal, I.; Gatherer, A.; Frantz, G.A.; Anderson, D.V.; Evans, B.L. *IEEE Signal Processing Magazine,* vol. 26, no. 6, Nov. 2009, pp. 38–49	This article gives an overview of multicore DSP trends and challenges, including programming of multicore DSPs.		**98**					1
ANALYSIS OF THE SECURITY OF PERCEPTUAL IMAGE HASHING BASED ON NONNEGATIVE MATRIX FACTORIZATION Khelifi, F.; Jiang, J. *IEEE Signal Processing Letters,* vol. 17, no. 1, Jan. 2010 (first published Sep. 2009), pp. 43–46	This article analyzes the security of a perceptual image hashing technique based on nonnegative matrix factorization that was recently proposed and reported in the literature.			**48**				1
A THEORY OF PHASE SINGULARITIES FOR IMAGE REPRESENTATION AND ITS APPLICATIONS TO OBJECT TRACKING AND IMAGE MATCHING Qiao, Y.; Wang, W.; Minematsu, N.; Liu, J; Takeda, M.; Tang, X. *IEEE Transactions on Image Processing,* vol. 18, no. 10, Oct. 2009, pp. 2153–2166	This paper studies phase singularities (PSs) for image representation and shows that PSs calculated with Laguerre-Gauss filters contain important information and provide a useful tool for image analysis.			58	**27**			2
FACE RECOGNITION USING DUAL-TREE COMPLEX WAVELET FEATURES Liu, C.C.; Dai, D.Q. *IEEE Transactions on Image Processing,* vol. 18, no. 11, Nov. 2009, pp. 2593–2599	This paper proposes a novel facial representation based on the dual-tree complex wavelet transform for face recognition, which is effective in representing the geometrical structures in facial image with low redundancy.			**66**				1
TRAINING AN ACTIVE RANDOM FIELD FOR REAL-TIME IMAGE DENOISING Barbu, A. *IEEE Transactions on Image Processing,* vol. 18, no. 11, Nov. 2009, pp. 2451–2462	This paper proposes to train Markov random fields (MRF)/conditional random fields (CRF) model together with a fast and suboptimal inference algorithm, which results in considerable gains in speed and accuracy.			**79**				1
AUTOMATIC IMAGE SEGMENTATION BY DYNAMIC REGION GROWTH AND MULTIRESOLUTION MERGING Ugarriza, L. G.; Saber, E.; Vantaram, S.R.; Amuso, V.; Shaw, M.; Bhaskar, R. *IEEE Transactions on Image Processing*, vol. 18, no. 10, Oct. 2009, pp. 2275–2288	This paper presents a new unsupervised color image segmentation algorithm, which exploits the information obtained from detecting edges in color images in the CIE L*a*b* color space.			84	**83**			2

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COLLABORATIVE CYCLOSTATIONARY SPECTRUM SENSING FOR COGNITIVE RADIO SYSTEMS Lunden, J.; Koivunen, V.; Huttunen, A.; Poor, H.V. *IEEE Transactions on Signal Processing,* vol. 57, no. 11, Nov. 2009, pp. 4182–4195	This paper proposes an energy efficient collaborative cyclostationary spectrum sensing approach for cognitive radio systems.			**95**				1
APPLICATION OF SIGNAL PROCESSING TO THE ANALYSIS OF FINANCIAL DATA Drakakis, K. *IEEE Signal Processing Magazine,* vol. 26, no. 5, Sep. 2009, pp. 158–160	This article highlights some of the techniques used to represent and predict the main features of price evolution and to classify stock so as to design diversified investment portfolios.				**11**			1
GAME THEORY AND THE FLAT-FADING GAUSSIAN INTERFERENCE CHANNEL Larsson, E.; Jorswieck, E.; Lindblom, J.; Mochaourab, R. *IEEE Signal Processing Magazine,* vol. 26, no. 5, Sep. 2009, pp. 18–27	This article describes basic concepts from noncooperative and cooperative game theory and illustrates them by three examples using the interference channel model.				**41**			1
CONTENT BASED IMAGE RETRIEVAL USING UNCLEAN POSITIVE EXAMPLES Zhang, J.; Ye, L. *IEEE Transactions on Image Processing,* vol. 18, no. 10, Oct. 2009, pp. 2370–2375	This paper presents a scheme for training CBIR systems with unclean positive samples. To handle the noisy positive samples, the paper proposes a new two-step strategy by incorporating the methods of data cleaning and noise tolerant classifier.				**63**			1
FLEXIBLE DESIGN OF COGNITIVE RADIO WIRELESS SYSTEMS Scutari, G.; Palomar, D.; Pang, J.-S.; Facchinei, F. *IEEE Signal Processing Magazine*, vol. 26, no. 5, Sep. 2009, pp. 107–123	This article presents that many unsolved resource allocation problems in the field of cognitive radio (CR) networks fit naturally either in the game theoretical paradigm or in the more general theory of VI.				**65**			1
GAME THEORY AND THE FREQUENCY SELECTIVE INTERFERENCE CHANNEL Leshem, A.; Zehavi, E. *IEEE Signal Processing Magazine,* vol. 26, no. 5, Sep. 2009, pp. 28–40	The paper discusses the importance of the frequency selective interference channel and shows that it has many intriguing aspects from a game theoretic point of view.				**66**			1
COMPRESSIVE-PROJECTION PRINCIPAL COMPONENT ANALYSIS Fowler, J.E. *IEEE Transactions on Image Processing,* vol. 18, no. 10, Oct. 2009, pp. 2230–2242	This paper presents a process that effectively shifts the computational burden of PCA from the resource-constrained encoder to a presumably more capable base-station decoder.				**70**			1
NOISE-DRIVEN ANISOTROPIC DIFFUSION FILTERING OF MRI Krissian, K.; Aja-Fernandez, S. *IEEE Transactions on Image Processing,* vol. 18, no. 10, Oct. 2009, pp. 2265–2274	This paper presents a new filtering method to remove Rician noise from magnetic resonance images.				**94**			1
RANDOM DISCRETE FRACTIONAL FOURIER TRANSFORM Hsue, W.L.; Pei, S.C. *IEEE Signal Processing Letters,* vol. 16, no. 12, Dec. 2009, pp. 1015–1018	This article proposes a random discrete fractional Fourier transform (RDFRFT) kernel matrix with random DFT eigenvectors and eigenvalues.				**98**			1
SUPER-RESOLUTION WITHOUT EXPLICIT SUBPIXEL MOTION ESTIMATION Takeda, H.; Milanfar, P.; Protter, M.; Elad, M. *IEEE Transactions on Image Processing*, vol. 18, no. 9, Sep. 2009, pp. 1958–1975	This paper introduces a novel framework for adaptive enhancement and spatiotemporal upscaling of videos containing complex activities without explicit need for accurate motion estimation.					**36**		

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A TOTAL VARIATION-BASED ALGORITHM FOR PIXEL-LEVEL IMAGE FUSION Kumar, M.; Dass, S. *IEEE Transactions on Image Processing,* vol. 18, no. 9, Sep. 2009, pp. 2137–2143	This paper proposes a total variation (TV) based approach for pixel-level fusion to fuse images acquired using multiple sensors.					**48**		1
N-SIFT: N-DIMENSIONAL SCALE INVARIANT FEATURE TRANSFORM Cheung, W.; Hamarneh, G. *IEEE Transactions on Image Processing,* vol. 18, no. 9, Sep. 2009, pp. 2012–2021	This paper proposes the n-dimensional scale invariant feature transform (n-SIFT) method for extracting and matching salient features from scalar images of arbitrary dimensionality.					**55**		1
IMAGE QUALITY ASSESSMENT BASED ON MULTISCALE GEOMETRIC ANALYSIS Gao, X.; Lu, W.; Tao, D.; Li, X. *IEEE Transactions on Image Processing*, vol. 18, no. 7, July 2009, pp. 1409–1423	This paper proposes a novel framework for image quality assessment (IQA) to mimic the human visual system (HVS) by incorporating the merits from multiscale geometric analysis (MGA), contrast sensitivity function (CSF), and the Weber's law of just noticeable difference (JND).					57	**30**	3
BRIDGING THE GAP BETWEEN SIGNAL AND POWER Bollen, M.H.J.; Gu, I.Y.H.; Santoso, S.; Mcgranaghan, M.F.; Crossley, P.A.; Ribeiro, M.V.; Ribeiro, P.F. *IEEE Signal Processing Magazine*, vol. 26, no. 4, Jul. 2009, pp. 12–31	This article focuses on problems and issues related to PQ and power system diagnostics, in particular those where signal processing techniques are extremely important.					**64**		1
IMAGE SEGMENTATION USING INFORMATION BOTTLENECK METHOD Bardera, A.; Rigau, J.; Boada, I.; Feixas, M.; Sbert, M. *IEEE Transactions on Image Processing*, vol. 18, no. 7, July 2009, pp. 1601–1612	This paper presents new image segmentation algorithms based on a hard version of the information bottleneck method.					69	**54**	2
AN ADAPTABLE K-NEAREST NEIGHBORS ALGORITHM FOR MMSE IMAGE INTERPOLATION Ni, K. S.; Nguyen, T. Q. *IEEE Transactions on Image Processing,* vol. 18, no. 9, Sep. 2009, pp. 1976–1987	The paper proposes an image interpolation algorithm that is nonparametric and learning-based, primarily using an adaptive k-nearest neighbor algorithm with global considerations through Markov random fields.					**80**		1
SUPER-RESOLUTION IMAGE RECONSTRUCTION: A TECHNICAL OVERVIEW Park, S.C.; Park, M.K.; Kang, M.G. *IEEE Signal Processing Magazine,* vol. 20, no. 3, May 2003, pp. 21–36	This article presents the technical review of various existing super resolution (SR) methodologies and models the low-resolution (LR) image acquisition process.					**86**	95	11
SIGNAL PROCESSING: A VIEW OF THE FUTURE, PART 2 Treichler, J. *IEEE Signal Processing Magazine,* vol. 26, no. 3, May 2009, pp. 83–86	This article attempts to produce a behavioral model for the field of signal processing and then use that model to predict the field's future.					91	**55**	5
IMAGE DENOISING USING MIXTURES OF PROJECTED GAUSSIAN SCALE MIXTURES Goossens, B.; Pizurica, A.; Philips, W. *IEEE Transactions on Image Processing*, vol. 18, no. 8, Aug 2009, pp. 1689–1702	This paper proposes a new statistical model for image restoration in which neighborhoods of wavelet subbands are modeled by a discrete mixture of linear projected Gaussian scale mixtures (MPGSM).					94	**33**	2
BEYOND BANDLIMITED SAMPLING Eldar, Y.; Michaeli, T. *IEEE Signal Processing Magazine,* vol. 26, no. 3, May 2009, pp. 48–68	This survey article presents several extensions of the Shannon theorem, which treat a wide class of input signals as well as nonideal sampling and nonlinear distortions.						**53**	4

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SUPER RESOLUTION WITH PROBABILISTIC MOTION ESTIMATION Protter, M.; Elad, M. *IEEE Transactions on Image Processing,* vol. 18, no. 8, Aug. 2009, pp. 1899–1904	This paper presents a new framework that leads to the same algorithm as the authors' prior work but with an approach that is much simpler and more intuitive.						**67**	1
MIMO DETECTION METHODS: HOW THEY WORK Larsson, E.G. *IEEE Signal Processing Magazine,* vol. 26, no. 3, May 2009, pp. 91–95	This tutorial article provides an overview of different MIMO detection approaches, in the communications receiver context.						**80**	4

from the EDITOR continued from page 2

very successful history not only to celebrate and admire but also to provide us with the fuel to guess, innovate, and define the future—not only for DSP, but for the technology and the societies we all live in.

I wrote in my March 2009 editorial about the transformational phase that DSP has been going through. Both our Editor-in-Chief Li Deng, and our previous Signal Processing Society (SPS) President José M.F. Moura, wrote in various editorials in 2009 about defining "signals" and "processing" and the "cross-pollination in signal processing technical areas." These new aspects, and to some extent transformational definition, of DSP become obvious when one views the technical program of ICASSP 2010. I wrote down various words from the technical program of ICASSP 2010 and here is the list I came up with: neural, engineering, new applications, radar imaging of interiors, social networks, mining, biomedical, multimodal mobile, smart cameras, body sensors, microlocal analysis, emotions, recovery, recognition, coding, real-time, audio, video, bioinformatics, estimation, enhancement, quality, array, systems, music, language, speech, acoustics, learning, perception, communications, adaptive processing, stereoscopic, 3-D, cognitive radio, statistical analysis, retrieval, tracking, networking, information theory, cooperative, sampling, modeling, synthesis, detection, sensing, machine learning, industrial applications, feature extraction, wireless, language and dialect, semantic, multichannel, underwater, security, forensics, and watermarking. I could not include all key words in this editorial due to space limitations, but from this list of words, one can easily sense how DSP covers a broad spectrum of "signals" that are "processed" in many different "ways" to arrive at various "decisions" to be used within a "system" or by an "individual."

WE AT *IEEE SIGNAL PROCESSING MAGAZINE* WORK VERY HARD TO CAPTURE THE ESSENCE OF DSP AND THE PROSPECTIVE OF THE DSP FUTURE.

We at *IEEE Signal Processing Magazine* work very hard to capture the essence of DSP and the prospective of the DSP future. One venue is the columns section of the magazine where we try to update you with the latest in many different aspects from education to applications and from lecture notes to news articles. In 2010, we are updating the purpose of the "In the Spotlight" column. We would like to use this column to inform all our readers of special events and meetings that are of interest and importance to the SPS. Therefore, we welcome suggestions of events or meetings; consider this a request. Also, in 2009 we started a new column called "Social Sciences," and per the success of that column and the positive feedback it generated, we plan to expand the column and publish it in every issue starting September 2010. It is also important to share with you some of the successes of our columns as a number of our columns have appeared in recent months in the list of top downloads in IEEE *Xplore*; this is also one of our columns ("Reader's Choice") that can be found in the first few pages of the magazine. We owe this success to all our readers and to all authors who contributed to our columns and forums. We thank you! And for those who we met at ICASSP, we say "It was great seeing you at ICASSP, and we look forward to a new decade full of successes and exciting contributions!" [SP]