# [reader's **CHOICE**]

## Top Downloads in IEEE *Xplore*

The "Reader's Choice" column in *Signal Processing Magazine* column has proivded information about recent downloads from all publications of the IEEE Signal Processing Society (SPS). This supplement to the print article provides additional download statistics and graphics. This month's column focuses on articles from the IEEE Tranactions on Image Processing. Future issues will look at top downloads from other publications of the Signal Processing Society. We hope this will increase the number of different articles we highlight, in part because we are guaranteed not to repeat from issue to issue, but also because journals with a focused readership will still have their top downloads highlighted.

The IEEE Transactions on Image Processing includes image processing, imaging systems, and image scanning, display, and printing. The "word cloud" below shows the concentration of topics used in the titles of the most downloaded papers over the past year weighted by the number of months the article was a top download. This journal considers theory, algorithms, and architectures for image coding, filtering, enhancement, restoration, segmentation, and motion estimation; image formation in tomography, radar, sonar, geophysics, astronomy, microscopy, and crystallography; image scanning, digital half-toning and display, and color reproduction; and emerging

topics related to image and video processing.

This issue's "Reader's Choice" lists the top ten articles most downloaded for the year ending in October 2015. Monthly downloads are shown on inset graphs below for each month of the previous year and show if the article is a steady performer, a brilliant flash, a past glory, or a rising star. Your suggestions and comments are welcome and should be sent to the Associate Editor Michael Gormish (gormish@ieee.org).

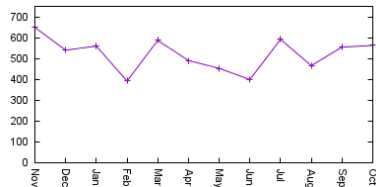## Image quality assessment: from error visibility to structural similarity

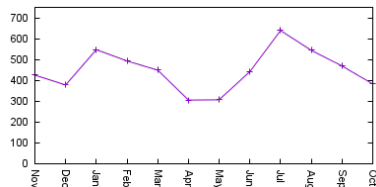Wang, Z.; Bovik, A.C.; Sheikh, H.R.; Simoncelli, E.P.



This paper introduces a framework for quality assessment based on the degradation of structural information. Within this framework a structure similarity index is developed and evaluated. MATLAB code available.
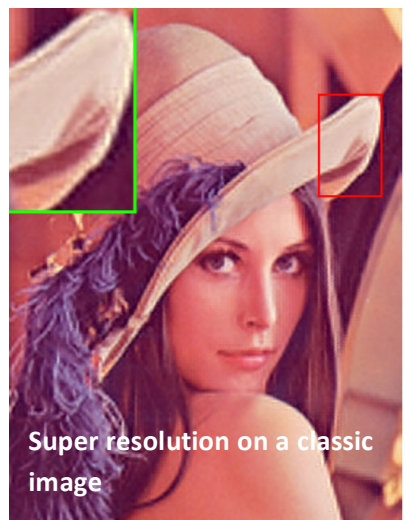
April 2004

## New Challenges for Image Processing Research

Pappas, T.N.

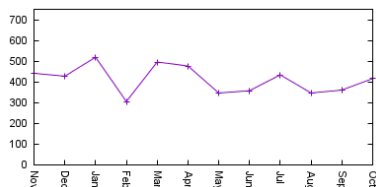

The IEEE Transactions on Image Processing Editor-in-Chief



Super resolution on a classic image

addresses the direction of the journal and image processing.

December 2011

## Image -Resolution Via Sparse Representation

Yang, J.; Wright, J.; Huang, T.S.; Ma, Y.



This paper presents an approach to single-image super-resolution based upon sparse signal representation of low and high resolution patches. Coefficients are determined for each patch of the low-resolution input, and then to generate the high-resolution output.

November 2010

## Vector Sparse Representation of Color Image Using Quaternion Matrix Analysis

Yi Xu; Licheng Yu ; Hongteng Xu ; Hao Zhang ; Truong Nguyen
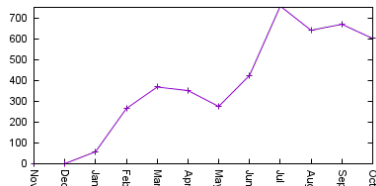


The proposed model represents the color image as a quaternion matrix, where a quaternion-based dictionary learning algorithm is presented using the K-quaternion singular value decomposition (QSVD) (generalized K-means clustering for QSVD) method. It conducts the sparse basis selection in quaternion space,

which uniformly transforms the channel images to an orthogonal color space. In this new color space, it is significant that the inherent color structures can be completely preserved during vector reconstruction.

April 2015

## Image Quality Assessment for Fake Biometric Detection: Application to Iris, Fingerprint, and Face Recognition

*Galbally, J.; Marcel, S.; Fierrez J.*
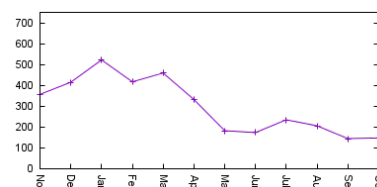


The proposed system attempts to enhance the security of biometric recognition frameworks, by adding a liveness assessment in a fast, user-friendly, and non-intrusive manner. Twenty-five general image quality features extracted from the authentication image to distinguish between legitimate and imposter samples for fingerprint, iris, and 2D face biometrics.

Februrary 2014

## Vector-Valued Image Processing by Parallel Level Sets

Ehrhardt, M.J.; Arridge, S.R.
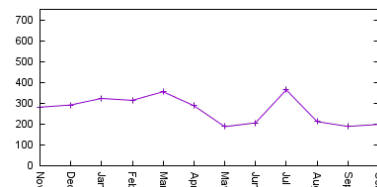


Considers the components of an image as a vector based on the

angle between the spatial gradients of their channels. By minimizing large angles parallel level sets are obtained and used for demosaicking.

January 2014

illumination variations by exploiting the fact that the set of all images obtained from a face image by non-uniform blurring and changing the illumination forms a bi-convex set.

July 2015

The Weighted Guided image filter incorporates an edge-aware weighting into existing guided image filter to address the problem of halo artifacts. The filter is applied to detail enhancement, haze removal and image fusion.

January 2015

### Face Recognition Across Non-Uniform Motion Blur, Illumination, and Pose

Punnappurath, A.; Rajagopalan, A.N. ; Taheri, S. ; Chellappa, R. ; Seetharaman, G.
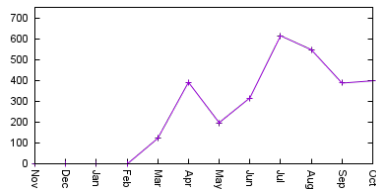
Presents a methodology for face recognition in the presence of space-varying motion blur comprising of arbitrarily-shaped kernels. The authors model the blurred face as a convex combination of geometrically transformed instances of the focused gallery face, and show that the set of all images obtained by non-uniformly blurring a given image forms a convex set. The framework is then extended to handle

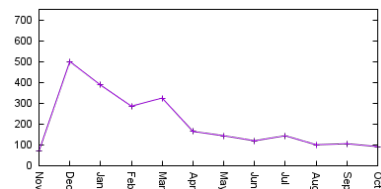### Active contours without edges

Chan, T.F.; Vese, L. A.
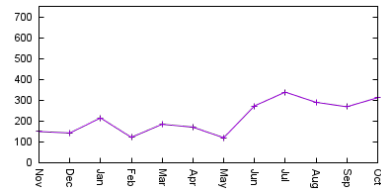
This paper presents a mdoel to detect objects using curve evolution. Numerical comparison show the advantage of a stopping criterea based on the segmentation rather than the gradient.

February 2001

### Weighted Guided Image Filtering

Li, Z.; Zheng, J.; Zhu, Z.; Yao, W.; Wu, S.

### Gradient Histogram Estimation and Preservation for Texture Enhanced Image Denoising

Zuo, W.; Zhang, L.; Song, C.; Zhang, D.; Gao, H.
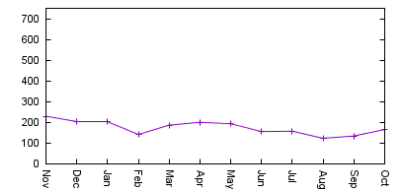
This paper avoids the smoothing associated with many denoising algorithms by preserving the histogram of gradients in an image. Region based variants handle different textures.

June 2014

Original Image, Noise Added Image, and several denoised images

3