IPOL (Image Processing On Line)
présentation et retours

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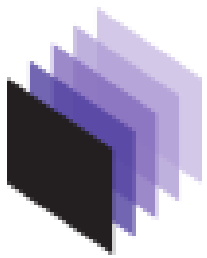
Retour d'expéRiences sur la Recherche Reproductible (R4),
Université d'Orléans, 3 et 4 décembre 2015.

IPOL: Image Processing On Line

Créé par Jean-Michel Morel et Nicolas Limare

en 2010-2011



(Reproducible Research journal)

Article(IPOL) = Texte + Codes source + Démo web

- Le Texte est un article au sens classique avec des algorithmes documentés et détaillés, téléchargable.
- Les Codes source (C/C++, Matlab) doivent être portables, utilisables dans différents environnements d'exécution (Mac, PC, ..., linux, windows), durables et disponibles au téléchargement.
- Une Démo web permettant aux utilisateurs de tester les algorithmes sur les données proposées par l'auteur ou sur leurs données personnelles avec leurs choix de paramètres.
- La Démo illustre le Texte et le Texte explique la Démo.

Comme toute revue scientifique

- les articles IPOL sont évalués par des rapporteurs et des éditeurs.
- IPOL a un *comité éditorial* qui évalue l'adéquation entre le texte et le code.

A la différence de beaucoup de revues de traitement du signal et d'image

- IPOL est une revue scientifique dont les résultats de ses articles sont reproductibles.
- Nouveauté:
  IPOL inclut maintenant des articles de traitement du signal audio. Une section video est un préparation pour 2016.

IPOL a:

- 86 articles publiés,
- 16 preprints.

(cinq années d'existence)

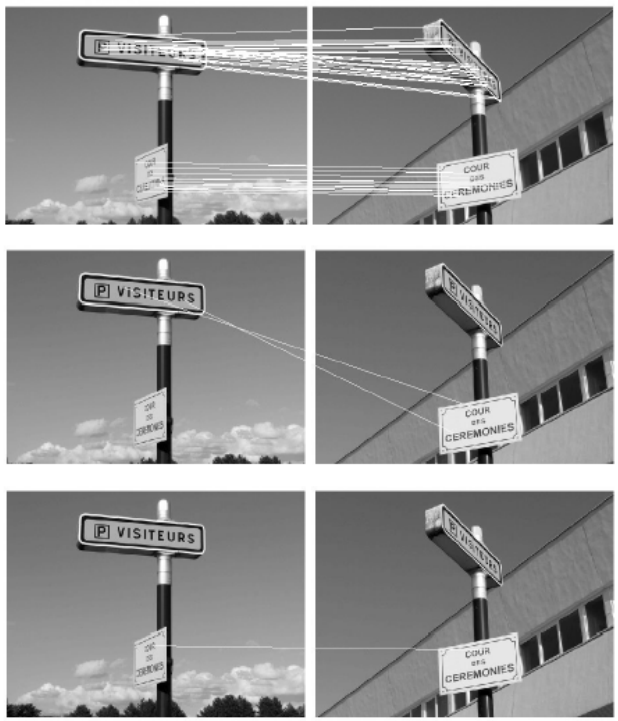
La nouveauté n'est pas exigée:

Un article IPOL peut reprendre un papier publié ailleurs et ajouter :

- la description d'un algorithme,
- les codes issus de cet algorithme et
- une démo qui utilise les codes et montre les résultats sur des données.

- ASIFT: A new framework for fully affine invariant image comparison, SIAM J. Imaging Sci., 2 (2009), pp. 438–469, J.-M. Morel and G. Yu.
- ASIFT: An Algorithm for Fully Affine Invariant Comparison, Image Processing On Line, 2011, G. Yu and J.M. Morel.

Experiments: Image Matching



Road signs.

Transition tilt: $\tau \approx 2.6$.

Number of correct matches:

ASIFT (top)—50;

SIFT (middle)—0;

MSER (bottom)—1.

- LSD: a fast line segment detector with a false detection control. PAMI, 32(4):722-732, Apr. 2010, R. Grompone Von Gioi, J. Jakubowicz, J.M. Morel, and G. Randall.
- LSD: a Line Segment Detector, Image Processing On Line, 2012, Rafael Grompone von Gioi, Jérémie Jakubowicz, Jean-Michel Morel, Gregory Randall.

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ASIFT: An Algorithm for Fully Affine Invariant Comparison

Guoshen Yu, Jean-Michel Morel

article | demo | archive

published • 2011-02-24 → BibTeX
reference • Guoshen Yu, and Jean-Michel Morel, *ASIFT: An Algorithm for Fully Affine Invariant Comparison*, Image Processing On Line, 1 (2011). http://dx.doi.org/10.5201/ipol.2011.my-asift

Communicated by Guillermo Sapiro
Demo edited by Nicolas Limare

Abstract

If a physical object has a smooth or piecewise smooth boundary, its images obtained by cameras in varying positions undergo smooth apparent deformations. These deformations are locally well approximated by affine transforms of the image plane. In consequence the solid object recognition problem has often been led back to the computation of affine invariant image local features. The similarity invariance (invariance to translation, rotation, and zoom) is dealt with rigorously by the SIFT method The method illustrated and demonstrated in this work, Affine-SIFT (ASIFT), simulates a set of sample views of the initial images, obtainable by varying the two camera axis orientation parameters, namely the latitude and the longitude angles, which are not treated by the SIFT method. Then it applies the SIFT method itself to all images thus generated. Thus, ASIFT covers effectively all six parameters of the affine transform.

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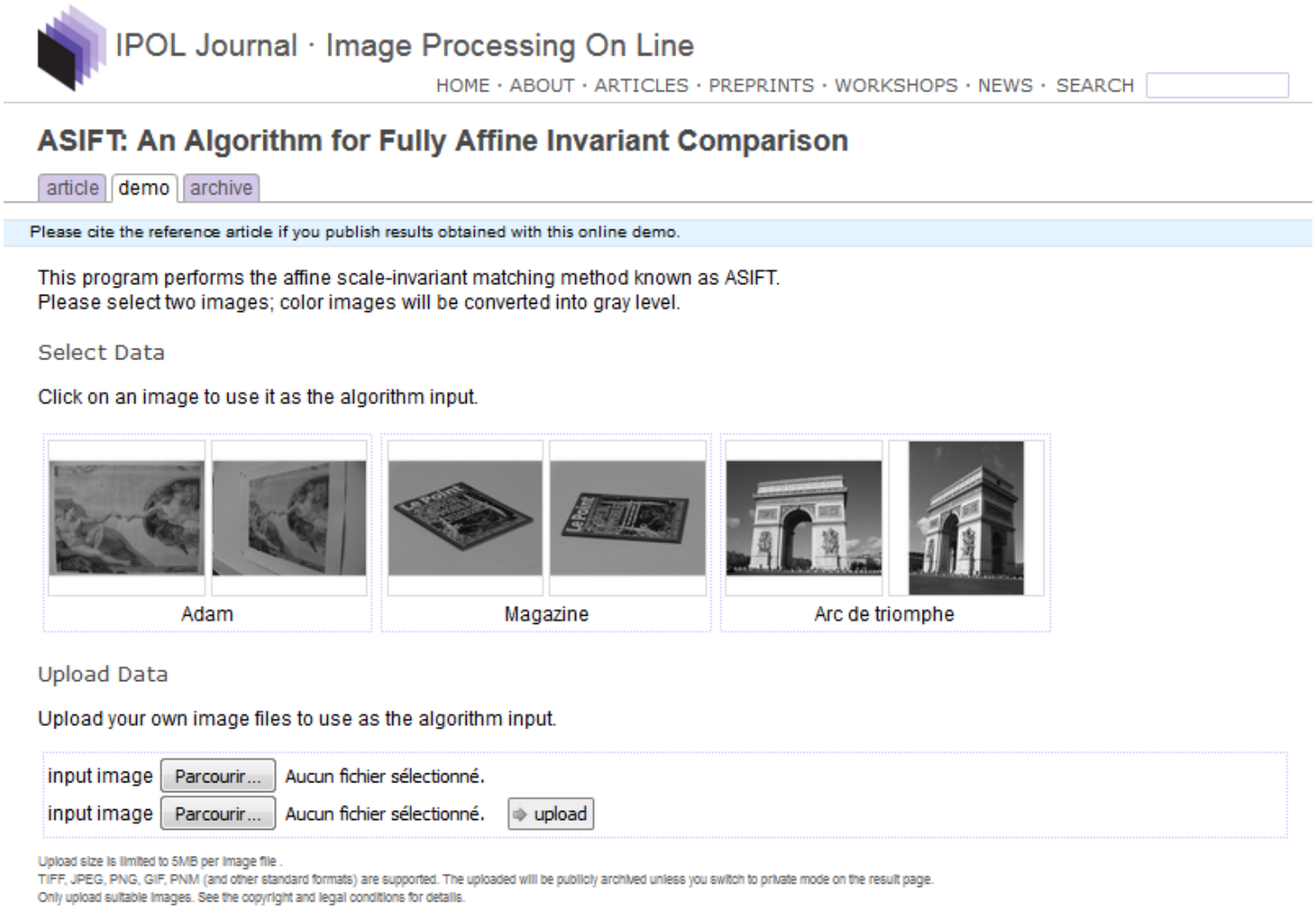
- source codes: TAR/GZ ZIP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This program performs the affine scale-invariant matching method known as ASIFT.
Please select two images; color images will be converted into gray level.
Select Data
Click on an image to use it as the algorithm input.
Adam
Magazine
Arc de triomphe
Upload Data
Upload your own image files to use as the algorithm input.
input image
Parcourir...
Aucun fichier sélectionné.
input image
Parcourir...
Aucun fichier sélectionné.
upload
Upload size is limited to 5MB per image file .
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ASIFT: An Algorithm for Fully Affine Invariant Comparison

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The algorithm result is displayed hereafter. It ran in 12.26s.

You can run again this algorithm with new data. ⇨ new input

Program Output

```
WARNING: The input images are resized to 800x600 for ASIFT.
         But the results will be normalized to the original image size.

Computing keypoints on the two images...
29362 ASIFT keypoints are detected.
24742 ASIFT keypoints are detected.
Keypoints computation accomplished in 5 seconds.
Matching the keypoints...
The two images match! 212 matchings are identified. log(nfa)=-255.909.
Keypoints matching accomplished in 2 seconds.
```

Output

ASIFT
212 matches

SIFT
0 matches

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1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 [2002]

key 09EB13FA0263F7C2611F8CC2140AF1A9
date 2015/11/24 15:08
files match_asift.txt.gz

images

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The Noise Clinic: a Blind Image Denoising Algorithm

Marc Lebrun, Miguel Colom, Jean-Michel Morel

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published • 2015-01-28 → BibTeX
reference • Marc Lebrun, Miguel Colom, and Jean-Michel Morel, *The Noise Clinic: a Blind Image Denoising Algorithm*, Image Processing On Line, 5 (2015), pp. 1–54. http://dx.doi.org/10.5201/ipol.2015.125

Communicated by Jacques Froment
Demo edited by Miguel Colom

Abstract

This paper describes the complete implementation of a blind image algorithm, that takes any digital image as input. In a first step the algorithm estimates a Signal and Frequency Dependent (SFD) noise model. In a second step, the image is denoised by a multiscale adaptation of the Non-local Bayes denoising method. We focus here on a careful analysis of the denoising step and present a detailed discussion of the influence of its parameters. Extensive commented tests of the blind denoising algorithm are presented, on real JPEG images and scans of old photographs.

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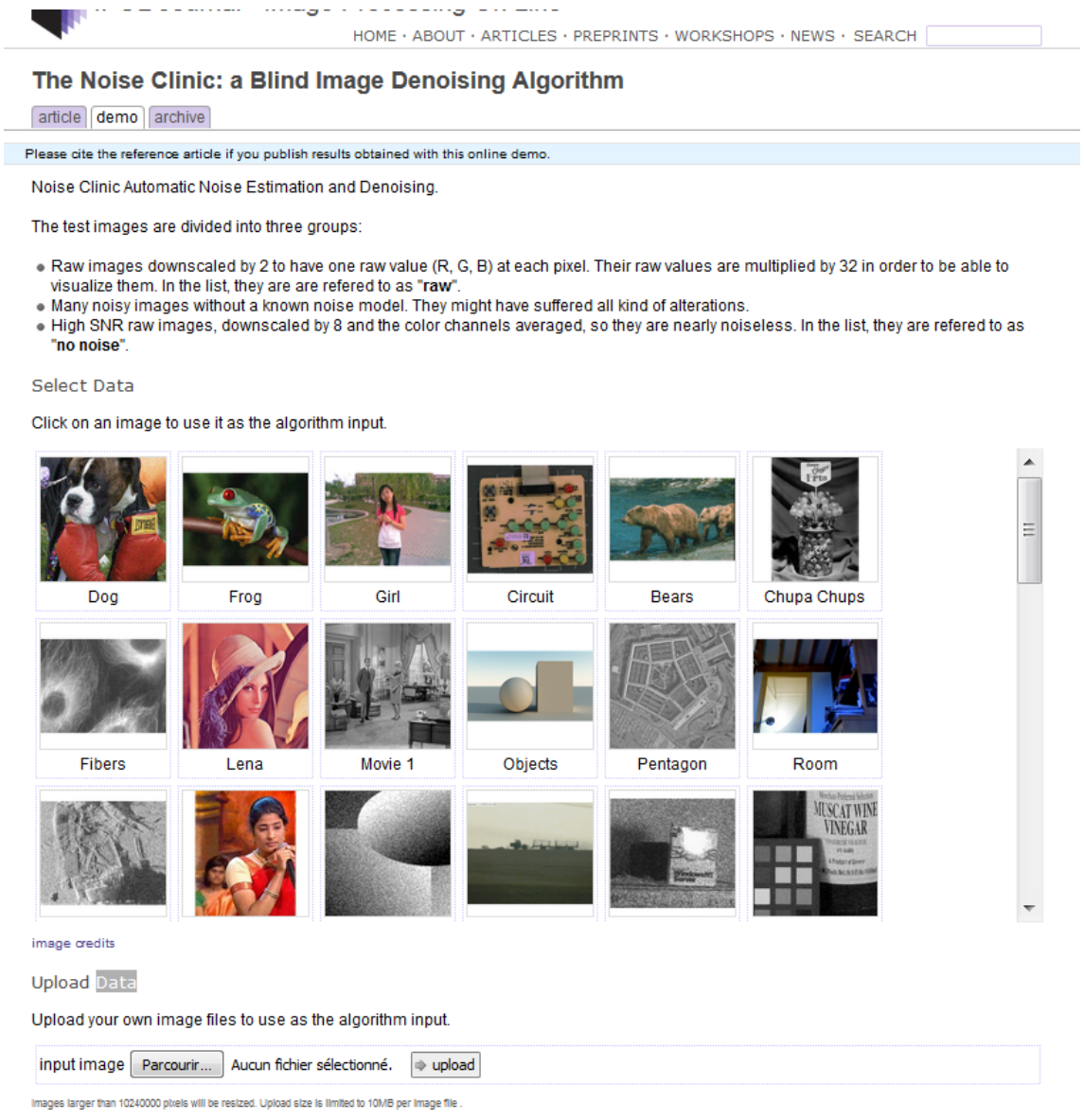
- source code: ZIP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The Noise Clinic: a Blind Image Denoising Algorithm
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Noise Clinic Automatic Noise Estimation and Denoising.
The test images are divided into three groups:
Raw images downscaled by 2 to have one raw value (R, G, B) at each pixel. Their raw values are multiplied by 32 in order to be able to visualize them. In the list, they are are refered to as "raw".
Many noisy images without a known noise model. They might have suffered all kind of alterations.
High SNR raw images, downscaled by 8 and the color channels averaged, so they are nearly noiseless. In the list, they are refered to as "no noise".
Select Data
Click on an image to use it as the algorithm input.
Dog
Frog
Girl
Circuit
Bears
Chupa Chups
Fibers
Lena
Movie 1
Objects
Pentagon
Room
image credits
Upload Data
Upload your own image files to use as the algorithm input.
input image
Parcourir...
Aucun fichier sélectionné.
upload
Images larger than 10240000 pixels will be resized. Upload size is limited to 10MB per image file .

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The Noise Clinic: a Blind Image Denoising Algorithm

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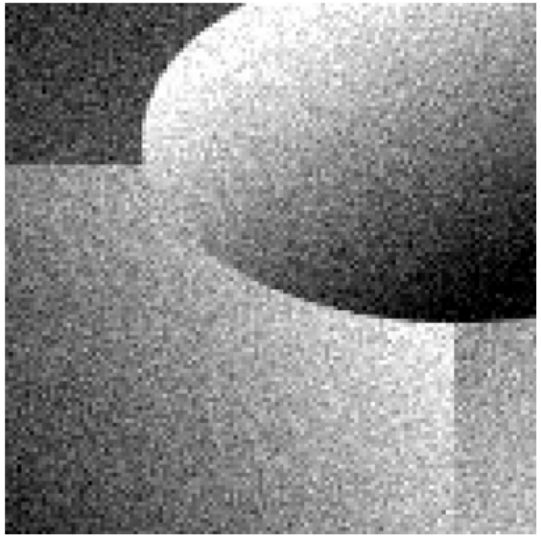
The algorithm result is displayed hereafter. It ran in 2.96s.
You can run again this algorithm with new data.

Restart with new input data, different parameter or different subimage: new input | different parameter or subimage

The Noise Clinic was configured with the following parameters:
- **STD coefficient:** 1.6.
- **Number of scales:** 2.

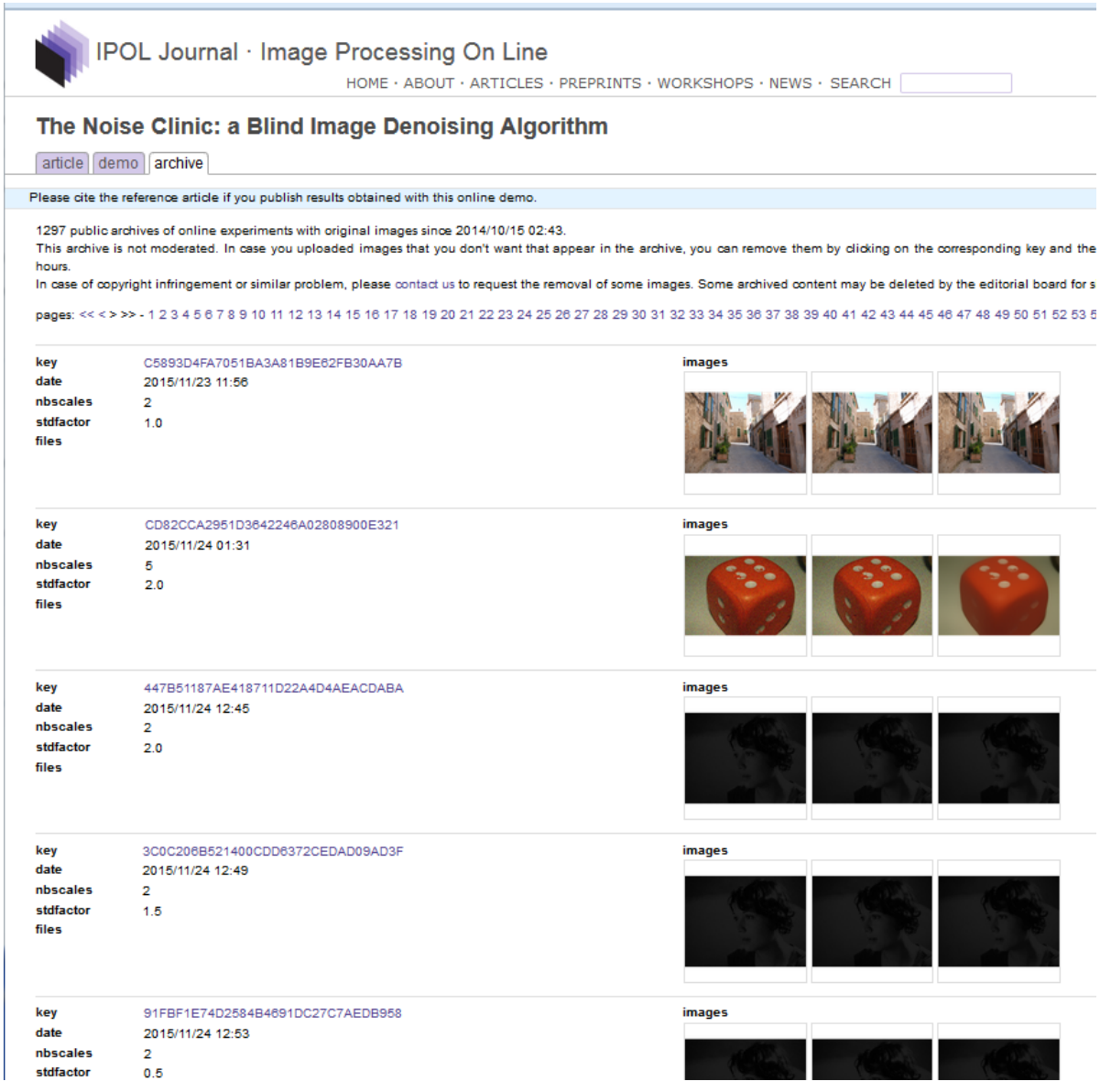
Noisy, denoised, and difference images

Original
Denoised
Difference



Difference image (left), mean noise curve for the low frequencies (middle), and for the high frequencies (right) at each scale

Scale #0
Scale #1



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key	C5893D4FA7051BA3A81B9E62FB30AA7B	images
date	2015/11/23 11:56	
nbscales	2	
stdfactor	1.0	
files		

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date	2015/11/24 01:31	
nbscales	5	
stdfactor	2.0	
files		

key	447B51187AE418711D22A4D4AEACDABA	images
date	2015/11/24 12:45	
nbscales	2	
stdfactor	2.0	
files		

key	3C0C206B521400CDD6372CEDAD09AD3F	images
date	2015/11/24 12:49	
nbscales	2	
stdfactor	1.5	
files		

key	91FBF1E74D2584B4691DC27C7AEDB958	images
date	2015/11/24 12:53	
nbscales	2	
stdfactor	0.5	

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Automatic Detection and Removal of Impulsive Noise in Audio Signals

Laurent Oudre

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published • 2015-11-21 → BibTeX
reference • Laurent Oudre, *Automatic Detection and Removal of Impulsive Noise in Audio Signals*, Image Processing On Line, 5 (2015), pp. 267–281. http://dx.doi.org/10.5201/ipol.2015.64

Communicated by Gaël Richard and Rafael Grompone von Gioi
Demo edited by Laurent Oudre

Abstract

This article presents a method for restoring audio signals corrupted by impulsive noise such as clicks, bursts or scratches. The algorithm takes as input a degraded audio signal and automatically detects the locations of the degraded samples and replaces them with more appropriate values. Both steps (detection and interpolation) are based on the assumption that the signal can locally be modeled as a realization of an autoregressive process. Surprisingly, the results obtained on several types of signals (classical, jazz, vocal, etc.) show that a fully automatic method, with a carefully fixed set of parameters, can achieve good performance on a wide range of degraded audio signals.

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- source code: ZIP

Automatic detection and removal of impulsive noise in audio signals

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Select Data

Click on an image to use the corresponding signal as input.

Upload Data

Upload your own audio signals to use as the algorithm input (WAV files).

input signal Parcourir... Aucun fichier sélectionné. upload

Automatic detection and removal of impulsive noise in audio signals

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The algorithm result is displayed hereafter. It ran in 12.17s.

Restart this algorithm with new data. new input

Restart this algorithm with new parameters. new parameters

Results

Parameters : K = 2.0 - b = 20 - p = 302 - Nw = 2416

Statistics

	Number of treated samples	Number of bursts	Minimum burst length	Maximum burst length	Average burst length
Iteration 1	15.07 %	19325	1	165	10.32
Iteration 2	25.93 %	25161	1	298	13.63
Global	36.65 %	30345	1	532	15.97

Sounds

Original:

Restored:

Random selection of bursts

	Number of treated samples	Number of bursts	Minimum burst length	Maximum burst length	Average burst length
Iteration 1	15.07 %	19325	1	165	10.32
Iteration 2	25.93 %	25161	1	298	13.63
Global	36.65 %	30345	1	532	15.97

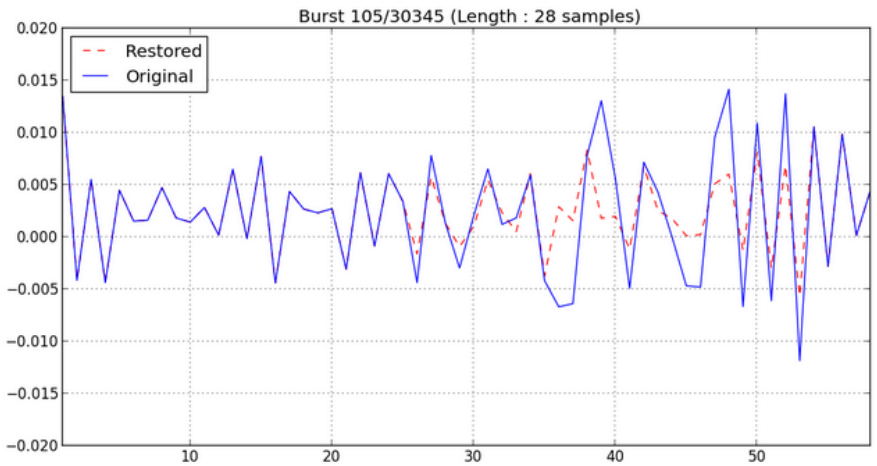
Sounds

Original:

Restored:

Random selection of bursts

- Example 1
- Example 2
- Example 3
- Example 4
- Example 5
- Example 6
- Example 7
- Example 8
- Example 9
- Example 10
- Example 11



- Non-local Pansharpening
  by Antoni Buades, Bartomeu Coll, Joan Duran and Catalina Sbert
- Segmentation using Otsu's method to find the optimal threshold of an image
  by Juan Pablo Balarini
- Classic bilateral filter
  by Martín Etchart
- Knot Detection from Accumulation Map by Polar Scan: Online Demonstration
  by Adrien Krähenbühl, Bertrand Kerautret and Fabien Feschet
- Ranking of Satellite Color Enhancement Methods
  by Jose-Luis Lisani, Julien Michel, Jean-Michel Morel, Ana Belen Petro and Catalina Sbert

Sound Processing Workshops

List of workshops related to sound processing. These workshops must follow the same rules of the Image Processing workshops.

- Short Time Fourier Transform
  by Eva Wesfreid
- Block Thresholding algorithm
  by Marie de Masson d'Autume, Christophe Varray, and Eva Wesfreid
- Block Thresholding algorithm (matlab version)
  by Marie de Masson d'Autume, Christophe Varray, and Eva Wesfreid
- Interpolation of missing samples in audio signals based on autoregressive modeling
  by Laurent Oudre
- Automatic detection and removal of impulsive noise in audio signals
  by Laurent Oudre
- Audio classifier
  by Gaston Bengolea

IPOL/SPOL authors: see the wiki documentation about publishing your own workshops.

...by IPC

Image Processing Workshops

The list hereafter collects links to papers, data, code, and interactive web interfaces (demos) for research works still in experimental and development status. *These are not articles*. These works are made available under the responsivility of their authors. There is no editorial control, no peer review, and no guarantee provided by the IPOL editorial commitee on their quality or availability.

- Piecewise Affine Image Segmentation Based on Mumford-Shah Functional
  by Gabriele Facciolo, Juan Cardelino, Enric Meinhardt
- Multi-Scale Multi-Window stereo matching
  by Gabriele Facciolo and Toni Buades
- Poisson Matting
  by Gabriele Facciolo
- Image Curvature Microscope
  by Adina Ciomaga, Lionel Moisan, Pascal Monasse and Jean-Michel Morel
- s2p: Satellite Stero Pipeline
  by Carlo de Franchis, Gabriele Facciolo, Enric Meinhardt, Julien Michel, and Jean-Michel Morel
- Adaptive thresholds for robust face detection with a short cascade of classifiers.
  by Jose-Luis Lisani
- ICIP2014: A non-Parametric Approach for the Estimation of Intensity-Frequency Dependent Noise.
  by Miguel Colom, Antoni Buades, and Jean-Michel Morel
- Nonparametric Multiscale Blind Estimation of Intensity-Frequency Dependent Noise.
  by Miguel Colom, Marc Lebrun, Antoni Buades, and Jean-Michel Morel
- Canny Pixels
  by Vincent Maioli and Enric Meinhardt-Llopis
- Image Approximation by Interpolation of Optimally Selected Data Points
  by Enric Meinhardt-Llopis
- Retinex Dithering
  by Enric Meinhardt-Llopis
- Simplest Mathematical Morphology
  by Enric Meinhardt-Llopis
- Turbulence Simulation: Geometric Deformations
  by Enric Meinhardt-Llopis

IPOL CITATIONS

Suivre

IPOL Journal Image Processing Online
Image Processing, Applied Mathematics
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Titre 1–20	Citée par	Année
LSD: a line segment detector RG Von Gioi, J Jakubowicz, JM Morel, G Randall IPOL Journal Image Processing On Line 2, 35-55	515 *	2012
Asift: An algorithm for fully affine invariant comparison G Yu, JM Morel IPOL Journal : Image Processing On Line 1	88	2011
Non-Local Means Denoising A Buades, B Coll, JM Morel IPOL Journal : Image Processing On Line 1	57	2011
Rudin-Osher-Fatemi total variation denoising using split Bregman P Getreuer IPOL Journal : Image Processing On Line 2, 79-95	55	2012
An Analysis and Implementation of the BM3D Image Denoising Method M Lebrun IPOL Journal Image Processing On Line 2, 175-213	37	2012
DCT image denoising: a simple and effective image denoising algorithm G Yu, G Sapiro IPOL Journal : Image Processing On Line 1	37	2011

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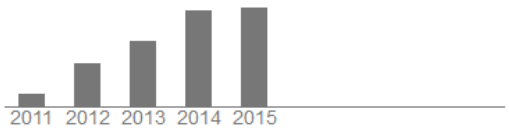
indice i10	27	27



TV-L1 Optical Flow Estimation J Sánchez, E Meinhardt-Llopis, G Facciolo IPOL Journal : Image Processing On Line. 3, 137-150	29 *	2013
Implementation of the "Non-Local Bayes" (NL-Bayes) Image Denoising Algorithm M Lebrun, A Buades, JM Morel IPOL Journal Image Processing On Line 3, 1-42	27 *	2013
Automatic homographic registration of a pair of images, with a contrario elimination of outliers L Moisan, P Moulon, P Monasse IPOL Journal : Image Processing On Line 2, 56-73	23	2012
An analysis of the SURF method E Oyallon, J Rabin IPOL Journal : Image Processing On Line 5, 176-218	21 *	2015
Horn-schunck optical flow with a multi-scale strategy E Meinhardt-Llopis, JS Pérez, D Kondermann IPOL Journal : Image Processing On Line 3, 151-172	21	2013
An Analysis of the Viola-Jones Face Detection Algorithm YQ Wang IPOL Journal : Image Processing On Line 4, 128-148	20	2014
Automatic color enhancement (ACE) and its fast implementation P Getreuer IPOL Journal : Image Processing On Line 2, 266-277	20	2012
An Implementation and Detailed Analysis of the K-SVD Image Denoising Algorithm M Lebrun, A Leclaire IPOL Journal Image Processing Online 2, 96-133	19 *	2012
Total variation deconvolution using split Bregman P Getreuer IPOL Journal : Image Processing On Line 2 (1), 158-174	18	2012