PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10789

, "Front Matter: Volume 10789," Proc. SPIE 10789, Image and Signal Processing for Remote Sensing XXIV, 1078901 (30 November 2018); doi: 10.1117/12.2519767

Event: SPIE Remote Sensing, 2018, Berlin, Germany

PROCEEDINGS OF SPIE

Image and Signal Processing for Remote Sensing XXIV

**Lorenzo Bruzzone
Francesca Bovolo**
Editors

**10–12 September 2018
Berlin, Germany**

Sponsored by
SPIE

Cooperating Organisations
European Optical Society
European Association of Remote Sensing Companies (Belgium)
CENSIS—Innovation Centre for Sensor and Imaging Systems (United Kingdom)
ISPRS—International Society for Photogrammetry and Remote Sensing
EARSeL—European Association of Remote Sensing Laboratories (Germany)
Remote Sensing & Photogrammetry Society (United Kingdom)

Published by
SPIE

Volume 10789

Proceedings of SPIE 0277-786X, V. 10789

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Image and Signal Processing for Remote Sensing XXIV, edited by Lorenzo Bruzzone,
Francesca Bovolo, Proc. of SPIE Vol. 10789, 1078901 · © 2018 SPIE
CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2519767

Proc. of SPIE Vol. 10789 1078901-1

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Image and Signal Processing for Remote Sensing XXIV*, edited by Lorenzo Bruzzone, Francesca Bovolo, Proceedings of SPIE Vol. 10789 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510621619
ISBN: 9781510621626 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2018, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/18/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

ix	Authors
xi	Conference Committee

IMAGE ENHANCEMENT AND CALIBRATION I

10789 02	Deployment of pansharpening for correction of local misalignments between MS and Pan [10789-1]
10789 03	Repeat multiview panchromatic super-resolution restoration using the UCL MAGiGAN system [10789-2]
10789 04	Nonuniformity determination of infrared imagers by detecting radiance temperatures with the Data Reference Method [10789-3]

IMAGE ENHANCEMENT AND CALIBRATION II

10789 06	Bulk reprocessing of the ALOS PRISM/AVNIR-2 archive of the European Space Agency: level 1 orthorectified data processing and data quality evaluation [10789-5]
10789 07	Preliminary study of JPSS-1/NOAA-20 VIIRS day-night band straylight characterization and correction methods [10789-6]
10789 09	Using interchannel correlation in blind evaluation of noise characteristics in multichannel remote sensing images [10789-8]
10789 0A	Towards a blind restoration method of hyperspectral images [10789-9]

IMAGE PROCESSING AND CLASSIFICATION

10789 0B	A novel active learning technique for multi-label remote sensing image scene classification [10789-10]
10789 0C	CNN-based ship classification method incorporating SAR geometry information [10789-11]
10789 0D	Systematic evaluation of CNN on land cover classification from remotely sensed images [10789-12]
10789 0E	A novel data-driven approach to tree species classification using high density multireturn airborne lidar data [10789-13]

10789 OF **A new architecture paradigm for image processing pipeline applied to massive remote sensing data production** [10789-14]

ANALYSIS OF HYPERSPECTRAL IMAGES

10789 OG **Unsupervised sparsity-based unmixing of hyperspectral imaging data using an online sparse coding dictionary** [10789-15]

10789 OH **Application of unsupervised nearest-neighbor density-based approaches to sequential dimensionality reduction and clustering of hyperspectral images** [10789-16]

10789 OI **The ExoMars Spectral Tool (ExoSpec): an image analysis tool for ExoMars 2020 PanCam imagery** [10789-17]

10789 OJ **Effects of Earth-atmosphere coupling irradiance modeling on spectral reflectance data accuracy** [10789-18]

10789 OK **Blind hyperspectral sparse unmixing based on online dictionary learning** [10789-19]

IMAGE ANALYSIS AND REGRESSION

10789 OL **New tool for spatio-temporal image fusion in remote sensing: a case study approach using Sentinel-2 and Sentinel-3 data** [10789-20]

10789 OM **Dimensionality reduction through random projections for application to the retrieval of atmospheric parameters from hyperspectral satellite sensors** [10789-21]

10789 ON **Quantitative analysis of petroleum hydrocarbon contaminated soils using spectroscopy, spectral unmixing and deep neural networks** [10789-22]

10789 OO **A novel approach for bathymetry of shallow rivers based on spectral magnitude and shape predictors using stepwise regression** [10789-23]

DEEP LEARNING TECHNIQUES AND APPLICATIONS

10789 OP **On the classification of passenger cars in airborne SAR images using simulated training data and a convolutional neural network** [10789-25]

10789 OQ **Improvement of persistent tracking in wide area motion imagery by CNN-based motion detections** [10789-26]

10789 OR **Conditional GANs for semantic segmentation of multispectral satellite images** [10789-28]

10789 OS **Scene classification of multisource remote sensing data with two-stream densely connected convolutional neural network** [10789-29]

IMAGE COMPRESSION AND 3D PROCESSING

- 10789 OT **A novel coarse-to-fine remote sensing image retrieval system in JPEG-2000 compressed domain** [10789-30]
- 10789 OV **Preliminary filtering and lossy compression of noisy remote sensing images** [10789-32]
- 10789 OW **Digital surface model generation from multiple optical high-resolution satellite images** [10789-33]
- 10789 OX **Deep learning performance for digital terrain model generation** [10789-34]

ANALYSIS OF SAR IMAGES

- 10789 OY **Automatic procedure for coastline extraction exploiting full-pol SAR imagery and AANN-PCNN processing chain** [10789-35]
- 10789 OZ **Destroyed-buildings detection from VHR SAR images using deep features** [10789-36]
- 10789 10 **Efficient nonparametric extraction of urban footprint from VHR SAR images** [10789-37]
- 10789 11 **Applying deep learning for agricultural classification using multitemporal SAR Sentinel-1 for Camargue, France** [10789-39]

JOINT SESSION WITH VOLUME 10788: SAR DATA PROCESSING I

- 10789 12 **B.SAR: blind SAR data focusing** [10789-40]
- 10789 13 **SAR ATR in the phase history domain using deep convolutional neural networks** [10789-41]

JOINT SESSION WITH VOLUME 10788: SAR DATA PROCESSING II

- 10789 16 **Autoregressive model for multi-pass SAR change detection based on image stacks** [10789-44]

POSTER SESSION

- 10789 17 **COSMO-SkyMed di Secunda Generazione SAR image focusing of spotlight data for civilian users** [10789-38]
- 10789 18 **A distributed system architecture for high-resolution remote sensing image retrieval by combining deep and traditional features** [10789-45]

10789 1B	Anomalies detected in hyperspectral images using the RX-based detector [10789-48]
10789 1C	Distance metric learning for ship classification in SAR images [10789-49]
10789 1D	A method of extracting construction areas using Gaofen-1 remote sensing images [10789-50]
10789 1E	Dominance of perceptual grouping over functional category: an eye tracking study of high-resolution satellite images [10789-51]
10789 1F	Segmentation of low-informative areas on panchromatic high spatial resolution images of Earth surface [10789-53]
10789 1G	Standard image products of Russian highly elliptical remote sensing system "Arktika-M" [10789-54]
10789 1H	Artifact suppression in multispectral images degraded by motion blur and restored by Wiener filtering [10789-56]
10789 1I	Ship detection in SAR images based on Shearlet features [10789-57]
10789 1L	Modular transfer function compensation for hyperspectral data from Resurs-P satellite system [10789-61]
10789 1N	One-dimensional convolution neural networks for object-based feature selection [10789-63]
10789 1P	Enhancement of spectral quality of natural land cover in the pan-sharpening process [10789-65]
10789 1Q	Transfocal analysis of unsteady stochastic structures for a signal from a retro-reflector [10789-66]
10789 1T	Determination of airphotograph timing in a day for 3D model of point clouds for temple archeology object [10789-69]
10789 1V	Subspace clustering algorithms for mineral mapping [10789-71]
10789 1Y	A graph-based approach for moving objects detection from UAV videos [10789-75]
10789 20	Simulation and analysis on laser range profiles for complex targets [10789-77]
10789 21	Research on target detection of SAR images based on deep learning [10789-73]
10789 22	Object-oriented crops classification for remote sensing images based on convolutional neural network [10789-78]
10789 23	Compression and coding of images for satellite systems of Earth remote sensing based on quasi-orthogonal matrices [10789-79]

- 10789 24 **SAR image despeckling based on variance constrained convolutional neural network**
[10789-81]
- 10789 25 **Improvement of interpretability of archival aerial photographs using remote sensing tools**
[10789-82]
- 10789 26 **AHI geometric quality assessment: an approach for systematic error correction** [10789-80]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Abdul Halin, Alfian, 1Y	Fan, Xinyan, 21
Abramov, Sergey K., 09, 0A, 0V	Fang, Xinan, 0S
Abramova, Victoriya V., 09	Fasano, Luca, 17
Ahmed, Asmau M., 0N	Gallipoli, Antonella, 17
Aiazzi, B., 02	Garzelli, Andrea, 02, 10
Allender, Elyse J., 0I	Gascon, Ferran, 06, 0L
Alparone, L., 02	Ghosh, Jayanta Kumar, 1E
Alver, Muhammed Burak, 13	Gloaguen, Richard, 1V
Alves, Dimas I., 16	Goryl, Philippe, 06
Aoki, Hirofumi, 0C	Guaragnella, Cataldo, 12
Arienzo, A., 02	Gunn, Matthew D., 0I
Arsenyan, Tatiana A., 1Q	Gutschwager, Berndt, 04
Atito, Sara, 13	Hammer, Horst, 0P
Attaf, Dalila, 1N	Hao, Hongxing, 0K
Babanin, Eugeny A., 1Q	Harikumar, A., 0E
Baghdadi, Nicolas, 1I	Harris, Joseph B., 26
Baronti, S., 02	Hartung, Christine, 0Q
Bayer, Fabio M., 16	He, Dongxu, 1D
Biasutti, Roberto, 06	He, Hongyan, 0J
Blank, Arkadiy V., 1Q	Hellsten, Hans, 16
Bovolo, Francesca, 0E, 0O, 0Z	Ho Tong Minh, Dinh, 1I
Bruzzo, Lorenzo, 0E, 0O, 0T, 0Z	Hoffmann, Klaus, 0P
Cao, Zhilin, 0S	Hollandt, Jörg, 04
Cariou, Claude, 0H	Hossard, Laure, 1I
Çetin, Müjdat, 13	Inversi, Paolo, 17
Chai, Xiaopeng, 1C	Jenerowicz, Agnieszka, 1P, 25
Chehdi, Kacem, 09, 0A, 0H, 0V	Jiang, Cheng, 0J
Chen, H., 07	Kalantar, Bahareh, 1Y
Chen, Jianbiao, 20	Kapranova, Ekaterina A., 23
Cheng, Qimin, 18	Karnaukhov, Victor N., 1H
Cheriguene, Sarah Rabia, 1N	Karoui, Moussa Sofiane, 1N
Cintra, Renato J., 16	Kattan, Eiman, 0D
Coates, Andrew J., 0I	Khodadadzadeh, Mahdi, 1V
Cong, Qiang, 1D	Kniaz, Vladimir V., 0R
Contreras, Cecilia, 1V	Knyaz, Vladimir, 0X
Courault, Dominique, 1I	Kochergin, A., 1F, 1G
Cousins, Claire R., 0I	Kolay, Saptarshi, 1E
Dammert, Patrik, 16	König, Sebastian, 04
De Laurentiis, Leonardo, 0Y	Krüger, Wolfgang, 0Q
Del Frate, Fabio, 0Y	Kuznetsov, A., 1F, 1G
Demir, Begüm, 0B, 0T	Lang, Haitao, 1C
Djerri, Khelifa, 1N	Lassalle, Pierre, 0F
D'Orazio, Tiziana, 12	Latini, Daniele, 0Y
Duran, Olga, 0N	Lei, Peng, 24
Egoshkin, Nikolay, 1F, 1G, 1L	Li, Chengyuan, 18
Elrewainy, Ahmed, 0G	Li, Jinling, 18
Eremeev, Victor, 1F, 1G, 1L	Li, Sen, 18
Ewiak, Ireneusz, 1P, 25	Li, Shengyang, 22
Facchinetti, Claudia, 17	Li, Suju, 1D

Liuzzi, Giuliano, 0M
 Lorusso, Rino, 17
 Lukin, Vladimir V., 09, 0A, 0V
 Ma, Li, 1C
 Machado, Renato, 16
 Makarenkov, Aleksandr, 1F, 1L
 Manighetti, Isabelle, 0W
 Mannan, Rubinder, 06
 Mansor, Shattri, 1Y
 Masiello, Guido, 0M
 Masse, Antoine, 0F
 Mattéo, Lionel, 0W
 Mecklenburg, Susanne, 0L
 Melet, Olivier, 0F
 Meloni, Marco, 06
 Mileva, Nikolina, 0L
 Mori, Nobutaka, 26
 Mozerov, Mikhail G., 1H
 Mueller, Rupert, 06
 Muller, J.-P., 03
 Ndikumana, Emile, 11
 Nenashev, Vadim A., 23
 Niroumand-Jadidi, Milad, 0O
 Ott, Yannick, 0F
 Oudrari, H., 07
 Palm, Bruna G., 16
 Pan, Zhuo, 11
 Paris, C., 0E
 Pettersson, Mats I., 16
 Preethy Byju, Akshara, 0T
 Qiu, Lei, 21
 Saha, Sudipan, 0Z
 Santurri, L., 02
 Sapta Widartono, Barandi, 1T
 Saunier, Sébastien, 06
 Schiavon, Giovanni, 0Y
 Schismak, Anna, 25
 Schulz, Karsten, 0P
 Schwarting, T., 07
 Schwind, Peter, 06
 Senda, Yuzo, 0C
 Senzaki, Kenta, 0C
 Sergeev, Mikhail B., 23
 Serio, Carmine, 0M
 Shafri, Helmi Zulhaidi M., 1Y
 Shao, Kang, 18
 Shao, Yuyang, 22
 Shao, Zhenfeng, 18
 Sharma, Ashu, 1E
 Sharma, Shreya, 0C
 Sherif, Sherif S., 0G
 Siok, Katarzyna, 1P, 25
 Smith, Mike, 0N
 Solovyev, V., 1G
 Song, Xiaorui, 0K
 Spraul, Raphael, 0Q
 Stabbins, Roger B., 0I
 Steenbergen, Theo, 26
 Storch, Tobias, 06
 Suhareva, Natalia A., 1Q

Sun, C., 07
 Sun, Huayan, 20
 Tao, Y., 03
 Tarabalka, Yuliya, 0W
 Tataranni, Francesco, 17
 Teshome Zegeye, Bayable, 0B
 Tusa, Laura, 1V
 Ueda, Naonori, 1Y
 Uss, Mykhail, 0A
 Varacalli, Giancarlo Natale, 17
 Vitti, Alfonso, 0O
 Vozel, Benoit, 09, 0A, 0V
 Vu, Viet T., 16
 Wan, Zhen, 0S
 Wang, Chao, 1D
 Wang, Geng-Gui, 1B
 Wang, Jun, 24
 Wang, Yanfei, 1I
 Wei, Hong, 0D
 Wu, Bin, 1D
 Wu, Jee-Cheng, 1B
 Wu, Lingda, 0K
 Xiong, X., 07
 Xu, Yongjie, 1C
 Yang, Ronghua, 0S
 Yin, Huan, 1D
 You, Yangsheng, 0S
 Yue, Anzhi, 1D
 Zand, Mohsen, 1Y
 Zemliachenko, Alexander N., 0V
 Zhan, Xueli, 1I
 Zhang, Mo, 0A
 Zhang, Ye, 21
 Zhao, Yanzhong, 20
 Zheng, Tong, 24
 Zhou, Zhuang, 22
 Zhu, Jun, 1D
 Zhu, Weigang, 21
 Zoppetti, Claudia, 10
 Zweiri, Yahya, 0N

Conference Committee

Symposium Chair

Christopher M. U. Neale, University of Nebraska-Lincoln
(United States) and Daugherty Water for Food Institute
(United States)

Symposium Co-chair

Karsten Schulz, Fraunhofer-Institut für Optronik, Systemtechnik und
Bildauswertung (Germany)

Conference Chair

Lorenzo Bruzzone, Università degli Studi di Trento (Italy)

Conference Co-chairs

Francesca Bovolo, Fondazione Bruno Kessler (Italy)
Jon Atli Benediktsson, University of Iceland (Iceland)

Conference Programme Committee

Selim Aksoy, Bilkent University (Turkey)
Luciano Alparone, Università degli Studi di Firenze (Italy)
José M. Bioucas-Dias, Universidade Técnica de Lisboa (Portugal)
Gustavo Camps-Valls, Universitat de València (Spain)
Jocelyn Chanussot, Laboratoire des Images et des Signaux (France)
Chi-Hau Chen, University of Massachusetts Dartmouth (United States)
B. S. Daya Sagar, Indian Statistical Institute, Bangalore (India)
Fabio Dell'Acqua, Università degli Studi di Pavia (Italy)
Begüm Demir, Università degli Studi di Trento (Italy)
Peijun Du, Nanjing University (China)
Andrea Garzelli, Università degli Studi di Siena (Italy)
Juha M. Hyypä, Aalto University (Finland)
Jordi Inglada, Centre d'Etudes Spatiales de la Biosphère (France)
Allan A. Nielsen, Technical University of Denmark (Denmark)
Antonio J. Plaza Miguel, Universitat de Extremadura (Spain)
David Small, Universität Zürich (Switzerland)
Yuliya Tarabalka, INRIA Sophia Antipolis - Méditerranée (France)
Florence Tupin, Télécom ParisTech (France)
Benoit Vozel, Université de Rennes 1 (France)
Josiane B. Zerubia, INRIA Sophia Antipolis - Méditerranée (France)

Session Chairs

- 1 Image Enhancement and Calibration I
Lorenzo Bruzzone, Università degli Studi di Trento (Italy)
- 2 Image Enhancement and Calibration II
Andrea Garzelli, Università degli Studi di Siena (Italy)
- 3 Image Processing and Classification
Antoine Masse, Centre National d'Études Spatiales (France)
- 4 Analysis of Hyperspectral Images
Benoit Vozel, Université de Rennes 1 (France)
- 5 Image Analysis and Regression
Claudia Zoppetti, Università degli Studi di Siena (Italy)
- 6 Deep Learning Techniques and Applications
Francesca Bovolo, Fondazione Bruno Kessler (Italy)
- 7 Image Compression and 3D Processing
Francesca Bovolo, Fondazione Bruno Kessler (Italy)
- 8 Analysis of SAR Images
Claudia Zoppetti, Università degli Studi di Siena (Italy)
- JS1 Joint Session with Volume 10788: SAR Data Processing I
Lorenzo Bruzzone, Università degli Studi di Trento (Italy)
- JS2 Joint Session with Volume 10788: SAR Data Processing II
Claudia Notarnicola, EURAC (Italy)
Lorenzo Bruzzone, Università degli Studi di Trento (Italy)