

PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10806

, "Front Matter: Volume 10806," Proc. SPIE 10806, Tenth International Conference on Digital Image Processing (ICDIP 2018), 1080601 (9 August 2018); doi: 10.1117/12.2510343

SPIE.

Event: Tenth International Conference on Digital Image Processing (ICDIP 2018), 2018, Shanghai, China

PROCEEDINGS OF SPIE

Tenth International Conference on Digital Image Processing (ICDIP 2018)

**Xudong Jiang
Jenq-Neng Hwang**
Editors

**11–14 May 2018
Shanghai, China**

Cosponsored by
Shanghai Key Laboratory of Multidimensional Information Processing (China)
International Association of Computer Science and Information Technology (Singapore)

Hosted by
East China Normal University (China)

Published by
SPIE

Volume 10806

Part One of Three Parts

Proceedings of SPIE 0277-786X, V. 10806

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

Tenth International Conference on Digital Image Processing (ICDIP 2018), edited by Xudong Jiang, Jenq-Neng Hwang
Proc. of SPIE Vol. 10806, 1080601 · © 2018 SPIE · CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2510343

Proc. of SPIE Vol. 10806 1080601-1

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 SPIEDigitalLibrary.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 *Tenth International Conference on Digital Image Processing (ICDIP 2018)*, edited by Xudong Jiang, Jenq-Neng Hwang, Proceedings of SPIE Vol. 10806 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

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

ISBN: 9781510621992
ISBN: 9781510622005 (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**

SPIEDigitalLibrary.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

xix	<i>Authors</i>
xxvii	<i>Conference Committee</i>
xxxiii	<i>Introduction</i>

FEATURE ANALYSIS AND EXTRACTION

10806 02	Old film jitter elimination algorithm based on L-K optical flow [10806-29]
10806 03	Research on auto-sorting system based on fusion semantics of regular expression [10806-39]
10806 04	Salient object extraction in low depth-of-field images using SVDD [10806-64]
10806 05	A credible depth estimation method based on superpixel constraint matching [10806-73]
10806 06	Exemplar-based image inpainting using structural feature offsets statistics [10806-83]
10806 07	Wide-baseline matching based on line intersection features [10806-127]
10806 08	An optimized SIFT algorithm based on color space normalization [10806-177]
10806 09	Interactive two-stage framework for blur QR code location with complex background [10806-184]
10806 0A	Fuzzy fractional canonical correlation analysis [10806-201]
10806 0B	Data augmentation based on interest points of feature [10806-279]
10806 0C	Feature extraction based on morphological attribute profiles for classification of hyperspectral image [10806-297]
10806 0D	Hand tracking based on compressed sensing and multiple feature descriptors [10806-301]
10806 0E	Support vectors classification method based on projection vector boundary feature [10806-312]

PATTERN RECOGNITION

- 10806 OF **Action recognition based on feature-level fusion** [10806-42]
- 10806 OG **Design and implementation of family service robots' object recognition based on Webots** [10806-50]
- 10806 OH **Accuracy evaluation of automated object recognition using multispectral aerial images and neural network** [10806-72]
- 10806 OI **Algorithm of 3D hand posture recognition with space coordinates based on optimal feature selection** [10806-87]
- 10806 OJ **A new two stages ATR architecture based on sparse auto encoder and learning network** [10806-92]
- 10806 OK **Adaptive key frame extraction from RGB-D for hand gesture recognition** [10806-101]
- 10806 OL **Synthetic aperture radar target identification based on incremental kernel extreme learning machine** [10806-134]
- 10806 OM **An improved auditory feature based on instantaneous frequency and gammatone filters for underwater acoustic target recognition** [10806-136]
- 10806 ON **Gait recognition based on optimized neural network** [10806-217]
- 10806 OO **3D object recognition based on improved point cloud descriptors** [10806-220]
- 10806 OP **Recognition of a plant leaf based on convolutional neural networks** [10806-222]
- 10806 OQ **Ship target recognition based on multi-spectral infrared images** [10806-298]
- 10806 OR **Weighted sparse fusion for FV and FDT identification** [10806-315]
- 10806 OS **A study on the robustness of adaptive pattern recognition** [10806-328]

TARGET DETECTION ALGORITHM AND APPLICATION

- 10806 OT **Saliency detection via background features** [10806-276]
- 10806 OU **A pedestrian detection algorithm based on deep deconvolution networks in complex scenes** [10806-7]
- 10806 OV **Long-term object tracking algorithm with occlusion-awareness and re-detection** [10806-24]

- 10806 0W **A contextual deep neural network with dilated convolutions for object detection in remote sensing images** [10806-43]
- 10806 0X **Lane detection using spline model for freeway aerial videos** [10806-108]
- 10806 0Y **Improving methods for detecting people in video recordings using shifting time-windows** [10806-121]
- 10806 0Z **Real-time dangerous objects detection in millimeter wave images** [10806-129]
- 10806 10 **Method for improving performance of fire control radar based on accumulation detection** [10806-130]
- 10806 11 **Moving object detection in videos from hand-held camera** [10806-133]
- 10806 12 **Forward vehicle detection method based on geometric constraint and multi-feature fusion** [10806-139]
- 10806 13 **Extend the shallow part of single shot multibox detector via convolutional neural network** [10806-141]
- 10806 14 **Dynamic object counting application based on object detection and tracking** [10806-154]
- 10806 15 **A lane detection system based on TDA2EG** [10806-163]
- 10806 16 **A maritime targets detection method based on hierarchical and multi-scale deep convolutional neural network** [10806-169]
- 10806 17 **System design for moving target tracking based on mean-shift algorithm** [10806-178]
- 10806 18 **An image preprocessing algorithm for infrared small target detection in the near-earth background** [10806-181]
- 10806 19 **Dynamic saliency detection via CNN and spatial-temporal fusion** [10806-195]
- 10806 1A **Multi-size object detection assisting fault diagnosis of power systems based on improved cascaded faster R-CNNs** [10806-200]
- 10806 1B **An improved faster R-CNN approach for robust hand detection and classification in sign language** [10806-210]
- 10806 1C **A convex method to minimal problems for fundamental matrix estimation with radial distortion** [10806-255]
- 10806 1D **Multi-target detection with larger scale difference** [10806-263]
- 10806 1E **Fabric surface detection using small sample learning based on naive Bayes** [10806-267]

- 10806 1F **The improved adaptive mean-shift algorithm of single target tracking for infrared images** [10806-280]
- 10806 1G **Multispectral salient object detection based on frequency domain** [10806-282]
- 10806 1H **Moving object detection based on 3D total variation and weighted nonconvex nuclear norm** [10806-296]
- 10806 1I **A closer look at U-net for road detection** [10806-300]

FACE DETECTION AND RECOGNITION

- 10806 1J **A detection method for facial expression reenacted forgery in videos** [10806-9]
- 10806 1K **A novel illumination normalization method in face recognition based on logarithmic total variation** [10806-38]
- 10806 1L **BGP face recognition method based on heuristic information** [10806-123]
- 10806 1M **Fast pedestrian detection using scale-aware pooling** [10806-142]
- 10806 1N **Forehead-based face detection algorithm with multi-feature cascade framework for classroom** [10806-194]
- 10806 1O **Double channel CNN for accurate age and gender estimation in complex scenarios** [10806-205]
- 10806 1P **Human detection in depth images via two steps** [10806-231]
- 10806 1Q **Head-heuristic human detection in RGB-D images** [10806-233]
- 10806 1R **Discriminative ability based facial expression recognition using kernel relief algorithm** [10806-240]
- 10806 1S **Real-time people detection from a top-view ToF camera** [10806-288]
- 10806 1T **Manifold aware discriminant collaborative graph embedding for face recognition** [10806-299]

IMAGE IDENTIFICATION

- 10806 1U **Automatic target-reading device based on image recognition and Raspberry Pi** [10806-68]
- 10806 1V **Three-dimensional convolutional neural networks applied to video sensor-based gait recognition** [10806-17]

- 10806 1W **Automatic oil tank recognition via detecting elliptic rooftop for optical UAV imagery** [10806-25]
- 10806 1X **An adaptive human action recognition system based on two-layer AP** [10806-75]
- 10806 1Y **A vehicle logo recognition method based on improved SIFT feature and bag-of-words model** [10806-118]
- 10806 1Z **An efficient accelerator unit for sparse convolutional neural network** [10806-180]
- 10806 20 **Application of cuckoo search algorithm for texture recognition based on water areas** [10806-209]
- 10806 21 **Recognition of color changes in strawberry juice powders using self-organizing feature map** [10806-224]
- 10806 22 **A fast wavelet-based algorithm for lunar terrain recognition with different data** [10806-277]
- 10806 23 **Balanced synthetic data for accurate scene text spotting** [10806-291]
- 10806 24 **Learning from synthetic data for automatic license plate detection and recognition** [10806-311]
- 10806 25 **Rail fastener automatic recognition method in complex background** [10806-314]

IMAGE ENHANCEMENT AND IMAGE DENOISING

- 10806 26 **Space-variant text image deblurring with nonconvex constraint** [10806-95]
- 10806 27 **Nonconvex variational model for space variant image deblurring** [10806-183]

Part Two

- 10806 28 **Low-light image enhancement using multi-layer fusion and detail recovery** [10806-21]
- 10806 29 **Deep sea image enhancement algorithm based on distance model** [10806-80]
- 10806 2A **Reducing the loss of color and details in single image defogging** [10806-91]
- 10806 2B **Research on the synthetic method of ink painting based on convolutional neural network** [10806-234]
- 10806 2C **Impulse noise removal based on adaptive multi-directional weighted mean filter** [10806-271]

IMAGE MATCHING

- 10806 2D **An improved matching method base on SURF** [10806-10]
- 10806 2E **Image matching algorithm with color information based on SIFT** [10806-11]
- 10806 2F **A template matching acceleration algorithm based on Cuda** [10806-35]
- 10806 2G **Registration of dense matched point cloud from UAV-borne images** [10806-40]
- 10806 2H **Deep space image registration method based on geometric feature of triangles constructed by neighbor stars** [10806-79]
- 10806 2I **Improved geometrical SAR image registration based on elevation correction** [10806-104]
- 10806 2J **Image registration of infrared and visible based on SIFT and SURF** [10806-186]
- 10806 2K **A spatiotemporal multiscale statistical matching (SMSM) model for human actions detection** [10806-318]

IMAGE SEGMENTATION

- 10806 2L **Profile measurement method of aviation part based on step boundary model** [10806-292]
- 10806 2M **A novel real-time video mosaic block detection based on intensity order and shape feature** [10806-341]
- 10806 2N **Liver tumor segmentation based on level set** [10806-2]
- 10806 2O **Fully convolutional neural network combined with K-means clustering algorithm for image segmentation** [10806-6]
- 10806 2P **Pulmonary nodules segmentation method based on auto-encoder** [10806-22]
- 10806 2Q **Anisotropic Gaussian kernels edge detection algorithm based on the chromatic difference** [10806-31]
- 10806 2R **Automatic segmentation of human depth map based on semantic segmentation of FCN and depth segmentation** [10806-51]
- 10806 2S **Local segmentation of skull CT image using morphological processing and sparse field level set method** [10806-103]
- 10806 2T **Human segmentation of the thermal infrared sequences with moving background** [10806-144]

- 10806 2U **Research on spectral clustering infrared image segmentation algorithm based on improved sparse matrix** [10806-171]
- 10806 2V **Real-time pedestrian detection for driver assistance systems based on deep learning** [10806-185]
- 10806 2W **Image target segmentation method based on fuzzy entropy and salient region extraction** [10806-266]
- 10806 2X **OCR with a convolutional neural networks integration model in machine vision** [10806-304]
- 10806 2Y **Dynamic texture segmentation using spectral clustering based on CHMMs** [10806-316]
- 10806 2Z **Edge detection based on adaptive oriented double opponent neurons** [10806-324]

HIGH-RESOLUTION IMAGES AND HYPERSPECTRAL IMAGES

- 10806 30 **Performance evaluation of phase diversity wavefront sensing in obtaining high-resolution images** [10806-12]
- 10806 31 **Iterative method to decompose hyperspectral mixed pixel using barycentric coordinate** [10806-77]
- 10806 32 **The model of additive noise of digital high spatial resolution images** [10806-111]
- 10806 33 **Single image super resolution based on multi-scale structural self-similarity and neighborhood regression** [10806-119]
- 10806 34 **An automatic liver fibrosis qualitative analysis method based on hyperspectral images** [10806-125]
- 10806 35 **Hyperspectral image classification based on dimension reduction combination and rotation SVM ensemble learning** [10806-164]
- 10806 36 **Local and global keypoint description for the high resolution remote sensing image registration** [10806-208]
- 10806 37 **A comparative study of different normalized difference vegetation indices from the wide band spectral imager of Tiangong II, China** [10806-215]
- 10806 38 **Hyperspectral image classification based on EMAPs spatial-spectral features fusion and SMLR** [10806-274]
- 10806 39 **Single image super-resolution based on residual learning and convolutional sparse coding** [10806-290]

3D RECONSTRUCTION

- 10806 3A **Stereo matching based 3D model reconstruction** [10806-30]
- 10806 3B **3D reconstruction of ultrasonic carotid artery based on fractal dimension and marching cubes** [10806-85]
- 10806 3C **Noncontact method for determination of the fuel assembly height by means of a 3D reconstruction** [10806-116]
- 10806 3D **Application of unmanned aerial vehicle oblique photography in 3D modeling of crag** [10806-155]
- 10806 3E **High precision measurement and 3D reconstruction of non-cooperative spacecraft based on binocular vision** [10806-187]
- 10806 3F **Compressive sensing magnetic resonance imaging reconstruction based on nonlocal autoregressive modeling** [10806-188]
- 10806 3G **Research on SAR image reconstruction based on optimized compressive sensing algorithm** [10806-190]

IMAGING SYSTEM DESIGN AND TECHNOLOGY

- 10806 3H **Sparse and adaptive fringe-enhancement efficiency analysis in 3D optical digital fringe-projection imaging** [10806-48]
- 10806 3I **A bistatic ISAR imaging method of rectilinear maneuvering target** [10806-66]
- 10806 3J **Microwave staring correlated imaging via the combination of nonconvex low-rank and total variation regularization** [10806-88]
- 10806 3K **Target discrimination via hyper-spectral imaging and spectral generalized angle analysis** [10806-105]
- 10806 3L **Radar correlated imaging for extended target by the clustered sparse Bayesian learning with Laplace prior** [10806-107]
- 10806 3M **Photon counting 3D imaging lidar adaptive target contours acquiring method** [10806-204]
- 10806 3N **A 3D denoising algorithm based on photon-counting imaging at low light level** [10806-236]
- 10806 3O **A low light SCMOS imaging system based on FPGA** [10806-241]
- 10806 3P **Three dimensional photon counting integral imaging based on Bayesian adaptive reconstruction** [10806-248]
- 10806 3Q **Oceanic surface XTI SAR simulation for TOPS imaging mode** [10806-278]

- 10806 3R **Imaging experiment of low frequency ultrawideband bistatic SAR using fixed-receiver configuration** [10806-319]
- 10806 3S **Fast time domain imaging for bistatic SAR including motion errors** [10806-321]
- 10806 3T **The study of panoramic images of water to air imaging based on space coordinate transformation** [10806-335]

FILTER DESIGN AND FILTERING ALGORITHM

- 10806 3U **Estimation of wet variable's background error information for regional model** [10806-86]
- 10806 3V **A novel correlation filter tracking algorithm based on feature integration** [10806-93]
- 10806 3W **ISAR image enhancement based on MCPF and special narrow spectrum filter** [10806-99]
- 10806 3X **SAR image filtering algorithm based on adaptive hexagonal window** [10806-124]
- 10806 3Y **Improved image haze removal algorithm based on fast guided filter** [10806-238]
- 10806 3Z **Review and research of speckle reducing filters for SAR image** [10806-338]
- 10806 40 **Parallel deblocking filtering algorithm on GPU** [10806-340]

VIDEO PROCESSING AND CODING TECHNOLOGY

- 10806 41 **Video tracking technology based on improved compressed sensing algorithm** [10806-13]
- 10806 42 **Smoky vehicle detection in surveillance video based on gray level co-occurrence matrix** [10806-45]
- 10806 43 **Smoke detection in video using dissipation function and support vector machine** [10806-46]
- 10806 44 **A 3D-CNN based video hashing method** [10806-82]
- 10806 45 **A video face clustering approach based on sparse subspace representation** [10806-100]
- 10806 46 **Novel pseudo-cylindrical projection based file segmentation scheme for omnidirectional video** [10806-146]
- 10806 47 **Design of high-reliability and HD video remote surveillance system** [10806-228]
- 10806 48 **A selective encryption algorithm of video based on white-box AES** [10806-286]

10806 49 **A fast CU partition algorithm based on the coding cost in screen content coding** [10806-326]

IMAGE PROCESSING TECHNOLOGY AND METHOD

10806 4A **Automatic image style transfer using emotion-palette** [10806-84]

10806 4B **Parameterization texture mapping method based on the simplification of irregular triangular mesh** [10806-19]

10806 4C **Image compressed sensing based on dictionary learning via bilinear generalized approximate message passing** [10806-26]

10806 4D **Example-based analysis and alignment system for human motion data** [10806-56]

10806 4E **Parameterized four direction contour-invariant extrapolator for DPCM image compression** [10806-143]

10806 4F **Methodology of data processing in the process of neural image analysis of pork half carcasses** [10806-157]

10806 4G **Estimating exposure and noise of space target image with bidirectional reflectance distribution function** [10806-216]

10806 4H **EM clustering algorithm modification using multivariate hierarchical histogram in the case of undefined cluster number** [10806-260]

10806 4I **NEDI-based interpolation for hierarchical image compression** [10806-261]

10806 4J **Generate optical flow with conditional generative adversarial network** [10806-302]

Part Three

10806 4K **A novel variation-based block compressed sensing restoration method** [10806-325]

10806 4L **Study on the performance of several SAR image gradient operators** [10806-339]

10806 4M **Image interpolation via discontinuous B-spline on android platform** [10806-23]

IMAGE INFORMATION MANAGEMENT AND SECURITY

10806 4N **A super-resolution infrared image information acquisition method based on mechanism of eye micro-movements** [10806-37]

10806 4O **Comparison of activation functions in a shallow convolutional neural network for natural image sharpness assessment** [10806-196]

- 10806 4P **Validation of a photogrammetric method for evaluating seed potato cover by a chemical agent** [10806-199]
- 10806 4Q **Using signal-to-noise ratio to connect the quality assessment of natural and medical images** [10806-211]
- 10806 4R **Joint concept factorization for image representation** [10806-251]
- 10806 4S **Blind image quality assessment for screen content images based on patch-wise multi-order derivatives** [10806-322]
- 10806 4T **A steganographic with better visual quality and security by improving full exploiting modification direction** [10806-327]

REMOTE SENSING TECHNOLOGY AND APPLICATION

- 10806 4U **Research for road detection technology in low illumination remote sensing image** [10806-4]
- 10806 4V **Scene classification of remote sensing image based on deep convolutional neural network** [10806-90]
- 10806 4W **A novel correlation method of microwave staring correlated imaging based on multigrid and LSQR** [10806-102]
- 10806 4X **A new variational fusion method for remote sensing images based on sparse representation** [10806-138]
- 10806 4Y **Cloud detection of remote sensing images on Landsat-8 by deep learning** [10806-173]
- 10806 4Z **Water area changes of the Tonle Sap Lake based on remote sensing data** [10806-249]
- 10806 50 **Single image thin cloud removal for remote sensing images based on conditional generative adversarial nets** [10806-259]
- 10806 51 **The application of UAV remote sensing in mapping of damaged buildings after earthquakes** [10806-265]
- 10806 52 **A novel rotation invariance hashing network for fast remote sensing image retrieval** [10806-268]
- 10806 53 **A novel remote sensing images fusion algorithm combining extended NSST and modified PCNN** [10806-323]
- 10806 54 **Road information extraction based on knowledge using WorldView-2 images** [10806-170]

MEDICAL IMAGE DETECTION AND SEGMENTATION

- 10806 55 **Non-contact heart rate measurements based on skin detection** [10806-3]
- 10806 56 **Post-processing for retinal vessel detection** [10806-5]
- 10806 57 **Lung nodules detection based on modified extreme learning machine with deep convolutional features** [10806-18]
- 10806 58 **Automatic quantification of crypt architecture in ex vivo gastrointestinal epithelium for high-resolution microendoscopic images** [10806-20]
- 10806 59 **Pseudo-3D fully convolutional DenseNets for brain tumor segmentation** [10806-41]
- 10806 5A **A modified faster R-CNN method to improve the performance of the pulmonary nodule detection** [10806-62]
- 10806 5B **Automated airway segmentation from chest CT images combined uniform and local intensities and airway topology structure** [10806-114]
- 10806 5C **Heart segmentation from chest x-ray images based on improved active shape model** [10806-147]
- 10806 5D **An end-to-end cells detection approach for colon cancer histology images** [10806-202]
- 10806 5E **An improved ultrasound image segmentation method based on level set** [10806-237]

MEDICAL IMAGE PROCESSING

- 10806 5G **False positive reduction of pulmonary nodules using three-channel samples** [10806-27]
- 10806 5H **Application of structural group sparsity recovery model for brain MRI** [10806-131]
- 10806 5I **Convolutional neural network for automated histopathological grading of breast cancer on digital mammograms** [10806-159]
- 10806 5J **Non-contact blood pressure measurement based on pulse transit time** [10806-174]
- 10806 5K **Fault diagnosis of aero-engine endoscopic image processing based on BP neural network** [10806-189]
- 10806 5L **A multiclass classification method for building MALDI-TOF mass spectrometry database of microbes based on SVM** [10806-239]
- 10806 5M **Medical image fusion based on NSCT and sparse representation** [10806-244]

- 10806 5N **Multimodal analysis of structural and functional MRI for Schizophrenia diagnosis** [10806-264]
- 10806 5O **Hippocampus analysis based on 3D CNN for Alzheimer's disease diagnosis** [10806-275]
- 10806 5P **Deep multi-label 3D ConvNet for breast cancer diagnosis in DBT with inversion augmentation** [10806-334]
- 10806 5Q **A method of dorsal hand vein identification** [10806-203]

COMPUTER VISION AND IMAGE PROCESSING

- 10806 5R **Cloud concentration classification of UAV images based on image quality** [10806-8]
- 10806 5S **Village detection based on deep semantic segmentation network in Google Earth satellite images** [10806-33]
- 10806 5T **Target measurement in elliptical orbit using generalized voxel coloring** [10806-47]
- 10806 5U **A novel range profile compensation method of high speed target for ISAR** [10806-61]
- 10806 5V **Explore fine-grained discriminative visual explanation when making classification decision** [10806-69]
- 10806 5W **An improved active contour model algorithm based on region** [10806-106]
- 10806 5X **Early wildfire smoke detection based on improved codebook model and convolutional neural networks** [10806-120]
- 10806 5Y **Weakly supervised semantic segmentation using constrained multi-image model and saliency prior** [10806-162]
- 10806 5Z **A study on classification of mineral pigments based on spectral angle mapper and decision tree** [10806-214]
- 10806 60 **Visualization technology research and application in partial-wear between the sucker rod and tube of pumping unit** [10806-218]
- 10806 61 **A comparison of shadow detection methods for high spatial resolution remote sensing images** [10806-219]
- 10806 62 **Design of an effective platform for unmanned aerial vehicles to collect research material in the form of aerial photographs** [10806-226]
- 10806 63 **Deep ViDAR: CNN based 360° panoramic video system for outdoor robot visual navigation and SLAM** [10806-250]
- 10806 64 **Checkerboard image processing under uneven illumination for robust Harris corner detection in camera calibration** [10806-337]

COMPUTER GRAPHICS AND PHOTOGRAPHIC TECHNOLOGY

- 10806 66 **A method of correction building roofs offset using wall baselines from SAR imagery** [10806-28]
- 10806 67 **3D pose estimation using low resolution time-of-flight (ToF) cameras** [10806-54]
- 10806 68 **The design for the optical part of a maintenance support system** [10806-65]
- 10806 69 **Enhanced light field depth estimation for complex occlusion scenes** [10806-145]
- 10806 6A **ReLU for sub space approximation and its application in dimension reduction** [10806-165]
- 10806 6B **A novel method for high dynamic range with binocular cameras** [10806-166]
- 10806 6C **Virtual game scenario generation using brain computer interface** [10806-167]
- 10806 6D **The virtual composing system for museum based on augmented reality technology** [10806-175]
- 10806 6E **Combining path-and-posture planning in 3D environment** [10806-289]

COMMUNICATION AND SIGNAL ANALYSIS

- 10806 6F **Extraction of cardiopulmonary rates from 24ghz Doppler radar using time frequency analysis** [10806-36]
- 10806 6G **Research on D2D resource allocation algorithm based on improved fuzzy clustering** [10806-53]
- 10806 6H **Research on single-point positioning and differential positioning of Beidou-2** [10806-117]
- 10806 6I **Mobile broadband waveform prediction based on BELLHOP model** [10806-172]
- 10806 6J **Efficient computation of the Strehl ratio for the wavefront coding system with the rotationally symmetric phase mask** [10806-212]
- 10806 6K **Design of the program for conversion from Kazak in China to IPA** [10806-252]
- 10806 6L **Detection of pulse-wave foot of photoplethysmography by projection mapping** [10806-303]
- 10806 6M **Early fault diagnosis of bearing using empirical wavelet transform with energy entropy** [10806-15]

COMPUTER INFORMATION THEORY AND TECHNOLOGY

- 10806 6O **Variational Bayesian super resolution acceleration using preconditioned conjugate gradient** [10806-44]
- 10806 6P **Hybrid connection network for semantic segmentation** [10806-109]
- 10806 6Q **An automatic acquisition algorithm for power distribution line based on vehicle-mounted system** [10806-128]
- 10806 6R **A tricolor monitoring system of net loan based on Weibo visualization** [10806-132]
- 10806 6S **Summarization of sequencing encryption algorithm based on AES and chaotic sequences** [10806-148]
- 10806 6T **Jamming decision under condition of feature incomplete database** [10806-161]
- 10806 6U **Geospatial location characteristics and global subdivision grid analysis of multiple disaster data** [10806-213]
- 10806 6V **Unsupervised neural classification of six chosen apple pests using learned vector quantization algorithm** [10806-227]
- 10806 6W **Data clustering based on label consistent constraint matrix factorization** [10806-253]
- 10806 6X **Research on artificial intelligence recommendation model based on genetic algorithm** [10806-254]
- 10806 6Y **Detection of sticker based adversarial attacks** [10806-283]
- 10806 6Z **Research on the multi-classifier features of the motor imagery EEG signals in the brain computer interface** [10806-305]
- 10806 70 **Local feature entropy based non-uniform simplification algorithm** [10806-333]

MODERN ELECTRONIC TECHNOLOGY AND APPLICATION

- 10806 71 **Effects of temperature environment on ranging accuracy of lidar** [10806-273]
- 10806 72 **Long-term persistence and cross-wavelet transform analysis of solar filament activity** [10806-317]

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.

Abdelkader, Ali Cherif, 3W
An, Jianmei, 7Z
An, Wei, 4Y
An, Xin, 58
Bai, Lianfa, 1F, 1G, 2K
Bai, Lin, 0C, 6M
Bai, Ye, 05
Bao, Wenxing, 35, 38
Bi, Cheng, 63
Bi, Jing, 2P, 57, 5G
Bian, He, 47
Bian, Jiali, 45
Bian, Zijian, 5B, 5B
Blokus, Adam, 0Y
Boniecki, P., 21, 4F, 4P, 62, 6V
Cai, Wei, 2U
Cai, Yunfang, 7Z
Cai, Zhi, 2R
Cao, Jianzhong, 3E, 4U, 55, 5J, 5T
Chang, Ming, 2R
Chang, Zhanqiang, 66
Chayakulkheeree, Jatuporn, 5P
Chen, Cong, 1Y
Chen, Enqing, 0F, 1X, 4D
Chen, Guoyue, 5D
Chen, Hong, 33
Chen, Jiajie, 50
Chen, Jianxuan, 6C
Chen, Jingyu, 6O
Chen, Li-chao, 0N
Chen, Pengyong, 55, 5J
Chen, Qian, 3M, 3N, 3P
Chen, Qiaosong, 28
Chen, Wei, 16
Chen, Weijun, 2O
Chen, Xiaodi, 6S
Chen, Xinhua, 3K, 6J
Chen, Youguang, 1H
Chen, Yuan, 6R
Chen, Yuanjin, 3P
Chen, Yuheng, 3K
Chen, Zengping, 1W, 3S
Chen, Zhao, 3V
Chen, Zhenping, 3R
Chen, Zhiquan, 0R
Chen, Zhongwei, 20
Cheng, Jixiang, 06
Cheng, Qingmei, 1N
Cheng, Wanli, 0F
Cheng, Xi En, 1P, 1Q
Cheng, Xuelong, 6X
Cheng, Yajun, 4N
Cheng, Yinbo, 4C
Cheng, Ying, 4G
Chong, Lanxiang, 5Q
Chu, Xiaoli, 70
Cui, Hong, 43
Cui, Qingqing, 1H
Cui, Ruoxuan, 5O
Dai, Guangzhe, 4Q
Dai, Houde, 0T
Dai, Peng, 25
Dai, Shaosheng, 4N
Dai, Wen, 71
Dan, Lijun, 5M
Deng, Wupeng, 09
Deng, Xin, 28
Deng, Xinpu, 4Y
Denisova, A. Y., 4H
Diao, Luhong, 6A
Ding, Shaohu, 0K
Ding, Youdong, 02
Dong, Liqian, 2R
Dong, Qingshuang, 2B
Dong, Sun, 02
Dong, Yingjie, 6Z
Dong, Zhen, 2I
Du, Jie, 1R
Du, Jindan, 71
Du, Xinyu, 25
Du, Xiuwen, 6Z
Du, Yunfei, 2E
Duan, Junyi, 4M
Duan, Yao, 0B
Egervári, Csanád, 6Y
Fan, Cheng, 5Z
Fan, Weikang, 5A
Fan, Xuewu, 30
Fang, Li, 46
Fang, Qian-xue, 10
Fang, T., 64
Feng, Jia, 47
Feng, Shangsheng, 28
Fojud, A., 4F, 4P
Fu, Canmiao, 13
Fu, Jun'e, 4Z, 51
Fu, Xinchuan, 1M
Gan, Bendui, 2I

Gao, Feng, 71
 Gao, Jianbo, 5A
 Gao, Jiani, 1G
 Gao, Peng, 2L
 Gao, Tianyu, 71
 Gao, Wei, 08, 2E, 5M
 Gao, Xiaohui, 3O
 Gao, Zhengxia, 5V
 Gashnikov, Mikhail, 4E, 4I
 Gawalek, J., 21, 4P
 Ge, Wei, 11
 Gierz, Ł., 21, 4F, 4P, 62, 6V
 Gierz, Sz., 4P
 Gong, Jian, 0Q
 Gong, Shizhong, 4T
 Gong, Zhaoxuan, 2P, 57, 5G
 Gong, Zhenfei, 2V
 Gowthaman, T., 5H
 Gu, Guohua, 3M, 3N, 3P
 Gu, Mei-Hua, 2Q
 Gu, Zichen, 25
 Guo, Canzhu, 3B
 Guo, Chenlong, 0L
 Guo, Chuanlei, 5X
 Guo, Cuicui, 1J
 Guo, Fan, 6C
 Guo, Huinan, 5T
 Guo, Mao, 2P
 Guo, Meng, 1N
 Guo, Qingpu, 6E
 Guo, Wei, 2P, 57, 5G
 Guo, Xiwei, 07
 Guo, Yaqin, 0E
 Guo, Yingjiu, 0P
 Hai, Jinjin, 5I
 Han, Shuping, 6I
 Han, Cheng, 05
 Han, Dong, 07
 Han, Jing, 1F, 1G, 2K
 Han, Mingfei, 1D
 Han, Pei, 4X
 Han, Zheng, 5Y
 He, Bing, 2O
 He, Bingqian, 5X
 He, Jian, 5S
 He, Jin, 67
 He, Jun, 1N
 He, Peng, 07
 He, Weiji, 3M, 3N, 3P
 He, Ying, 67
 He, Zhiwei, 15
 He, Zhiyong, 1E
 Hnatushenko, Volodymyr, 0H
 Horváth, András, 6Y
 Hou, Chuan-xun, 18
 Hou, Yuxin, 3Q
 Hu, Changhui, 1K
 Hu, A-min, 0N, 4B
 Hu, Bingliang, 5Z
 Hu, Guo Liang, 3E, 4U
 Hu, Huanjun, 2A
 Hu, Jing Fang, 1P
 Hu, Jinshuang, 2M
 Hu, Jiwei, 09
 Hu, Qiuping, 68
 Hu, Shiming, 66
 Hu, Yuping, 1V
 Hu, Zhaoyang, 1A, 1O
 Hu, Zhe, 5W
 Huang, Haifeng, 3Q
 Huang, Huimin, 3E, 47, 4U, 5T
 Huang, Jianqiang, 2J
 Huang, Jing, 4A
 Huang, Jiye, 15
 Huang, Lai, 20
 Huang, Yingjie, 68
 Huang, Zhangjin, 23
 Huang, Zhiliang, 1Y
 Hui, Bingwei, 0O
 Hui, Mei, 2R
 Hui, Meng, 0C
 Huo, H., 64
 Huo, Nan, 6F
 Ji, Yiqun, 3K
 Jia, Jianbang, 2J
 Jia, Xiaoyan, 5Y
 Jia, Xin, 3I, 5U, 6T
 Jia, Ying, 69
 Jia, Zhenyuan, 2L
 Jiang, Aiwen, 5V
 Jiang, Hanni, 0K
 Jiang, Huiqin, 5A
 Jiang, Miao, 6H
 Jiang, Rui, 5C
 Jiang, Shengqin, 39
 Jiang, Tuochi, 08
 Jiang, Wei, 0T
 Jiang, Xiaoyong, 3P
 Jiang, Xudong, 56
 Jiao, Shuai, 66
 Jin, Peiquan, 0W, 52
 Jin, Xiaoying, 0G
 Josephraj, Alex Noel, 3B, 41, 5E
 Kamagara, Abel, 3H
 Kamata, Sei-ichiro, 6P
 Kan, Guangyuan, 51
 Kim, Kyeong-Seop, 6L
 Kim, Yoohwan, 2P, 57, 5G
 Kong, Lanfang, 1A, 1O
 Kong, Lingchuang, 57
 Kong, Lingqin, 2R
 Koszela, K., 4F, 4P, 62, 6V
 Kou, Xinyu, 48
 Kravtsov, Sergey, 32, 3C
 Krawczyk, Henryk, 0Y
 Lan, Zhiguang, 2L
 Lee, Jeong-Whan, 6L, 6L
 Lei, Hao, 2E
 Lei, Lei, 2M, 40
 Lei, Naihai, 41

Lei, Tianjie, 4Z, 5I
 Leng, Haibing, 3O
 Li, Ailan, 0P
 Li, Baopeng, 2E
 Li, Bin, 0A, 59
 Li, Changkai, 3Z, 4L, 5K
 Li, Chi, 2A
 Li, Cong-Li, 5R
 Li, Fuhai, 3R, 3S
 Li, Guoxin, 58
 Li, Hai, 2N
 Li, Hao, 58
 Li, Hong-an, 0N, 4B
 Li, Hongbo, 3O
 Li, Huiqi, 2Z
 Li, Jianxiang, 6Q
 Li, Jing, 44
 Li, Juelong, 16
 Li, Jun, 1K, 2D, 4Y
 Li, Jupan, 04
 Li, Li, 3D
 Li, Liwei, 1L
 Li, Na, 2Y
 Li, Po, 6F
 Li, Qian, 3V
 Li, Qingli, 34
 Li, Ruimei, 0I
 Li, Ruoyu, 4O, 4Q
 Li, Shanjun, 1A, 1O
 Li, Shengyang, 1D
 Li, Shi, 6O
 Li, Sikun, 3H
 Li, Ting, 5Q
 Li, Weihai, 69
 Li, Wen Jun, 29
 Li, Wenyang, 0K
 Li, Xia, 2N
 Li, Xing, 1X
 Li, Xingyue, 0W, 52
 Li, Xinyi, 68
 Li, Yao, 5N
 Li, Yi Cheng, 1P, 1Q
 Li, Yiwen, 4A
 Li, Yongbin, 0X
 Li, Yonghong, 6K
 Li, Yun, 0A
 Li, Zhan-li, 0N, 4B
 Li, Zhidan, 06
 Li, Zhongke, 0V
 Li, Zhu, 15, 29, 2F
 Liang, Bin, 67
 Liang, Chang, 63
 Liang, Jiarui, 22
 Liang, Lei, 71
 Liang, Xiao, 6P
 Liao, Chang, 1S
 Liao, Qingmin, 0R, 1C, 4J, 4S
 Lin, Caiyan, 6R
 Lin, Liyu, 53
 Lin, Mingqiang, 0T
 Lin, Song, 1E
 Lin, Xiaoli, 4K
 Lisiak, D., 4F, 6V
 Liu, Changqing, 2U
 Liu, Chengming, 4M
 Liu, Guiyang, 1D
 Liu, Hao, 58
 Liu, J.-P., 64
 Liu, Jiange, 5S
 Liu, Jiren, 5B
 Liu, Kai, 17
 Liu, Liqiang, 47
 Liu, Lizhou, 1I
 Liu, Manhua, 5N, 5O
 Liu, Ming, 2R
 Liu, Mingshan, 6G
 Liu, Qingsheng, 37
 Liu, Qiufei, 2Y
 Liu, Qiuxia, 2Y
 Liu, Quan, 09
 Liu, Ruihao, 5N
 Liu, Ryan Wen, 26, 27
 Liu, Siyu, 1U
 Liu, Song-Tao, 2W
 Liu, Tianbo, 3I
 Liu, Tong, 29
 Liu, Wei, 2L, 6H
 Liu, Xiaojing, 4B
 Liu, Xinlong, 4G
 Liu, Yan, 6B
 Liu, Yancong, 60
 Liu, Yang, 6E, 6G
 Liu, Zhanqiang, 36
 Liu, Zhi, 0U, 49
 Long, Jiachuan, 3T
 Long, Jiao, 2M, 40
 Long, Xianzhong, 4R, 6W
 Long, Xin, 6B
 Lou, Ping, 09
 Lou, Songjiang, 1T
 Lu, Jingxuan, 4Z, 5I
 Lu, Bing, 03
 Lu, Chun, 6X
 Lu, Guanghua, 3J, 3L, 4W
 Lu, Ruqian, 6E
 Lu, Tongwei, 26, 27
 Lu, Xiaobo, 0X, 1K, 1Y, 39, 42
 Lu, Ziwei, 33
 Lu, Zongqing, 1C, 4J
 Łukomski, M., 21, 62
 Luo, Guibo, 1J
 Luo, Yupin, 04
 Lv, Xuefeng, 6U
 Ma, Caiwen, 5M
 Ma, Hongjin, 2C
 Ma, Ling, 5A
 Ma, Xing, 0G, 0K
 Ma, Xinxing, 0Q
 Ma, Xiuli, 1S
 Ma, Yanghui, 1T

Ma, Yufeng, 25
 Maksimov, Aleksei, 4E
 Mao, Dong, 3O
 Mei, Xue, 45
 Ming, Yiming, 2S
 Mo, Ruihong, 3U
 Mozgovoy, Dmitriy, 0H
 Mu, Chengpo, 17
 Mu, Chunyang, 0G, 0K
 Mu, Dejun, 5S
 Mu, Xiao-dong, 4V
 Nema, Anant, 5H
 Nie, Guhong, 0B
 Nie, Hewen, 4N
 Nie, Xin, 26
 Nie, Yufeng, 2C
 Niu, Wenjie, 6O
 Niu, Xin, 0B
 Niu, Zhaodong, 1W
 Pan, Qianqian, 2N
 Pan, Ting, 3Y
 Pan, Weidong, 5L
 Pang, Zhiguo, 4Z, 51
 Peng, Changzhe, 3H
 Peng, Kangbo, 20
 Peng, Yong Kong, 1Q
 Piekarska-Boniecka, H., 6V
 Przybył, J., 4F, 6V
 Przybył, K., 21, 4F, 62, 6V
 Qi, Haifeng, 44
 Qi, Jijia, 3P
 Qi, Lin, 3A, 61, 63
 Qi, Yi, 72
 Qian, Tingting, 3L, 4W
 Qian, Yiming, 2S
 Qiang, Ji-Peng, 0A
 Qiao, Baowen, 4U
 Qiao, FengXiang, 2O
 Qiao, Kai, 5I
 Qiao, Rui, 54
 Qiao, Yulong, 2Y
 Qiu, Lingteng, 2X
 Qiu, Rongchao, 0Q
 Qiu, Shaohua, 0O
 Qiu, Song, 34
 Qiu, Wenhui, 6X
 Qu, Wei, 4Z, 51
 Rao, Xin, 61
 Ren, Rong, 35, 38
 Ren, Shaoqian, 2D
 Ren, Yi, 31
 Ren, Zhifeng, 6H
 Ruan, Min, 0A
 Ruan, Zhimin, 3D
 Rumyantsev, Konstantin, 32, 3C
 Saruta, Kazuki, 5D
 Seo, Seung-Yeon, 6L
 Sergeyev, V. V., 4H
 Shang, Zhuowen, 3T
 Shao, Shihai, 1M
 Shao, Yuyang, 1D
 Shao, Zhanjian, 2F
 Shen, Chao, 08, 5M
 Shen, Weimin, 3K, 6J
 Shen, Xiao-Bo, 0A
 Sheng, Jinhui, 2Y
 Sheng, Qinghua, 2F
 Shi, Dapeng, 5I
 Shi, Feng, 54
 Shi, Jinglei, 14
 Shi, Shaoying, 3R, 3S
 Si, Jingjing, 4C
 Ślórsarz, P., 4F, 6V
 Song, Chul-Gyu, 6L
 Song, Xin, 0E
 Song, Yiwei, 71
 Song, Zongxi, 08, 2E, 5M
 Srinivasan, Kathiravan, 5H
 Su, Bin-Bin, 2Q
 Su, Xiaoping, 0V
 Sun, Bo, 1N
 Sun, Chao, 0Q
 Sun, Jiande, 44
 Sun, Jun, 03
 Sun, Li, 34
 Sun, Shiqi, 6R
 Sun, Shouqian, 1V
 Sun, Wen, 4S
 Sun, Yannan, 6U
 Sun, Yanru, 0U
 Sun, Yong, 6Q
 Sun, Yuxuan, 57
 Sun, Zaoyu, 2I
 Tan, Hongna, 5I
 Tan, Linglong, 3G
 Tan, Wenjun, 5B
 Tan, Yanan, 4Z
 Tan, Yong, 2T
 Tang, Da, 1W
 Tang, Feifei, 3D
 Tang, Jimin, 3M
 Tang, Tao, 0X
 Tang, Ting, 4J
 Tao, Huanjie, 42
 Tao, Rentuo, 59
 Tao, Wang, 2G
 Tao, Wenbing, 14, 2V
 Terata, Yuki, 5D
 Tian, Xiaolin, 22, 5C
 Tie, Yun, 1R, 3A, 63
 Touafria, Mohamed, 0J
 Tscai, Zhi-Ren, 0S
 Tu, Zhigang, 2A
 Vasyliiev, Volodymyr, 0H
 Vateekul, Peerapon, 5P
 Wan, Changsheng, 0V
 Wan, Jianwei, 0M
 Wan, Jianyi, 5V
 Wan, Shouhong, 0W, 52
 Wan, Wenbo, 44

Wang, Chao, 1S
 Wang, Dayu, 0P
 Wang, Donghui, 1Z
 Wang, Fei, 3G
 Wang, Feng, 08
 Wang, Fengtao, 5M
 Wang, Guochao, 3J, 3L, 4W
 Wang, Guoqian, 3R, 3S
 Wang, Guoyou, 1A, 1O
 Wang, Haipeng, 6Q
 Wang, He-Nan, 2W
 Wang, Hongzhi, 2N
 Wang, Hua, 47
 Wang, JianSheng, 34
 Wang, Jiaoyun, 4C
 Wang, Jin, 28, 3F
 Wang, Jinwei, 1B
 Wang, Kaiming, 59
 Wang, Leiou, 1Z
 Wang, Licheng, 36
 Wang, Liming, 2A
 Wang, Luyao, 58
 Wang, Miao-Miao, 2Q
 Wang, Pingquan, 5Y
 Wang, Qiang, 68
 Wang, Qin, 1F
 Wang, Ruiqi, 46
 Wang, Sheng, 0Z
 Wang, Shengchun, 25
 Wang, Shuang, 5Z
 Wang, Weihua, 1W
 Wang, Xiangzhao, 3H
 Wang, Xianping, 72
 Wang, Xiaofeng, 6J
 Wang, Xiaohong, 56
 Wang, Xiaoqing, 3Q
 Wang, Xiaoying, 2J
 Wang, Xingjun, 48
 Wang, Xinyu, 2V
 Wang, Yan, 0Z
 Wang, Yang, 51
 Wang, Yigang, 6O
 Wang, Ying, 4Z
 Wang, Yong, 3W
 Wang, Yueqin, 3Z
 Wang, Zhan, 2W
 Wang, Zhaoyang, 4O, 4Q
 Wang, Zhi-Lei, 2Q
 Wang, Zhuozheng, 6Z
 Wei, Wei, 5X
 Wei, Wenpeng, 3O
 Wei, Yinpeng, 2U
 Wen, Desheng, 08
 Wen, Gongjian, 0O
 Wen, Tiexiang, 4O
 Wen, Weiwei, 0O
 Wen, Ying, 2O
 Weng, Guirong, 2S
 Wichakam, Itsara, 5P
 Wu, Bing, 2B
 Wu, Biao, 02
 Wu, Changqiang, 3N
 Wu, Chaowei, 5N
 Wu, Chengdong, 33
 Wu, Hong, 6S
 Wu, Hongzhi, 54
 Wu, Huan, 2J
 Wu, Jianqi, 5L
 Wu, Jie, 1M
 Wu, Kejun, 2Y
 Wu, Lingqi, 4J
 Wu, Minghui, 5I
 Wu, Qiang, 44, 6Z
 Wu, Shuang, 3Q
 Wu, Xi, 3F
 Wu, Xiaojun, 24, 2X
 Wu, Xiaozhong, 20
 Wu, Yue, 6B
 Wu, Yuqing, 58
 Xi, Wei, 6M
 Xiao, Hui, 3R, 3S
 Xie, Chao, 39
 Xie, Fengying, 50
 Xie, Habin, 1L
 Xie, Heng, 58
 Xie, Hongtu, 3R, 3S
 Xie, Wei, 2A
 Xie, Xiaomin, 4L, 5K, 5K
 Xie, Yaoqin, 4O, 4Q
 Xin, Ruiqing, 6K
 Xing, Jianchun, 16
 Xing, Qiang, 6T
 Xu, Dong, 19
 Xu, Hui, 2H
 Xu, Jingbo, 5I
 Xu, Ke, 0M
 Xu, Min, 02
 Xu, Nan, 3I
 Xu, Nuo, 1V
 Xu, Pei, 28
 Xu, Shiyou, 3R, 3S
 Xu, Shu-chang, 6D
 Xu, Wei, 3F, 6Q
 Xu, Xiaodong, 03
 Xue, Bin, 1I
 Xue, Song, 5R
 Yan, Bin, 5I
 Yan, Jiaojiao, 5Q
 Yan, Wenshan, 28
 Yan, Yuchan, 0C, 6M
 Yang, Bai-long, 3X, 4T
 Yang, Chenhao, 15
 Yang, Dong, 54
 Yang, Fan, 2L
 Yang, Haojin, 5A
 Yang, Hongtao, 4U, 55, 5J
 Yang, Huayong, 4K, 53
 Yang, Jian-wen, 10
 Yang, Jun, 67
 Yang, Jungang, 4Y

Yang, Lei, 47
 Yang, Qiang, 0J
 Yang, Qiliang, 16
 Yang, Wenming, 0R, 4S
 Yang, Yonghong, 6R
 Yang, Yongyuan, 5E
 Yang, Yu, 17
 Yang, Yuan-qing, 18
 Yang, Z., 64
 Yang, Zhicheng, 24, 2X
 Yang, Zhou, 4V
 Yao, Min, 3T
 Yao, Peng, 61
 Yao, Ying, 23
 Ye, Fan, 2L
 Ye, Long, 1R, 46
 Ye, Zhen, 0C, 6M
 Ye, Zhongfu, 1B
 Ye, Zuochang, 0Z
 Yi, Hongwei, 4G
 Yi, Peng, 60
 Yin, Fei, 5M
 Yin, Wei, 27
 Yin, Xiaoli, 60
 Yu, Anxi, 2I
 Yu, Bing, 02
 Yu, Feihong, 2H
 Yu, Hongzhi, 6K
 Yu, Jie, 66
 Yu, Liangbing, 4N
 Yu, Mingjun, 5Y
 Yu, Shangyang, 6R
 Yu, Shaode, 4O, 4Q
 Yu, Tianhe, 3Y, 3Y
 Yu, Xiaosheng, 33
 Yu, Xiaoyong, 2E
 Yu, Yang, 5L
 Yu, Yanling, 6G
 Yu, Yue, 6D
 Yu, Zhezhou, 3V
 Yuan, Bo, 3J
 Yuan, Lijie, 3A
 Yuan, Qing-shu, 6D
 Yuan, Ruifeng, 2R
 Yuan, Xiaobin, 2E
 Yuan, Yun-Hao, 0A
 Yue, Jiang, 1F, 2K
 Yue, Zhihui, 4M
 Zaborowicz, M., 21, 4F, 62, 6V
 Zeng, Chuangzhan, 3I, 5U
 Zeng, Lei, 5I
 Zeng, Xiangrong, 6B
 Zeng, Xiaoshuang, 4Y
 Zeng, Yadan, 0T
 Zeng, Yong, 4L, 5K
 Zeng, Zhengda, 4S
 Zhai, Jia, 43
 Zhai, You, 07
 Zhang, Bin, 5X
 Zhang, Chao, 05
 Zhang, Chenlu, 1I
 Zhang, Chongyang, 12
 Zhang, Fan, 3G, 5K
 Zhang, Fuxu, 6C
 Zhang, Ge, 6E
 Zhang, Guodong, 2P, 57, 5G
 Zhang, Guoliang, 7I
 Zhang, Haifeng, 47
 Zhang, Hao, 1E, 2M, 40
 Zhang, Jiaohao, 43
 Zhang, Jiashu, 2M, 40
 Zhang, Jin, 45
 Zhang, Jiuxing, 4X
 Zhang, Lin, 3R, 3S
 Zhang, Ling, 30
 Zhang, Linke, 4T
 Zhang, Liwei, 2N
 Zhang, Longfei, 4D
 Zhang, Mengmeng, 0U, 49
 Zhang, Pengchang, 5Z
 Zhang, Qi, 19
 Zhang, Qiang, 43
 Zhang, Qin, 46
 Zhang, Rui, 2X, 50
 Zhang, Ruijun, 6R
 Zhang, Si-Yu, 5R
 Zhang, Tian, 0I
 Zhang, Wanwan, 5G
 Zhang, Wei, 4X
 Zhang, Weimin, 3U
 Zhang, Wenbo, 6G
 Zhang, Wengang, 49
 Zhang, Xianfu, 1V
 Zhang, Xin, 6A
 Zhang, Xingguo, 5D
 Zhang, Xinyu, 2S
 Zhang, Xu, 6Q
 Zhang, Xurui, 1V
 Zhang, Yan, 70
 Zhang, Yang, 1K, 2L
 Zhang, Yating, 6B
 Zhang, Yazhen, 5I
 Zhang, Yi, 1F
 Zhang, Yifan, 0M
 Zhang, Yong-chun, 6D
 Zhang, Yu, 0I
 Zhang, Zhen, 2Z
 Zhang, Zhicheng, 4O
 Zhang, Zhi-li, 18
 Zhang, Zuoluo, 1C
 Zhao, Dazhe, 5B
 Zhao, Feng-an, 4V
 Zhao, Guoru, 2Z
 Zhao, Haiyang, 2L
 Zhao, Hui, 30
 Zhao, Junhao, 43
 Zhao, Ting, 4U, 55, 5J
 Zhao, Wenqiang, 4T
 Zhao, Wenzheng, 1H
 Zhao, Xiaofeng, 2U

Zhao, Xiaoming, 1T
Zhao, Xin, 6C
Zhao, Xingqun, 58
Zhao, Yanlai, 3U
Zhao, Yong, 13, 1I
Zhao, Yuejin, 2R
Zhao, Yulin, 1Z
Zhao, Yunxiu, 05
Zheng, Guangyong, 6T
Zheng, Liwen, 13
Zheng, Peiyun, 2E
Zheng, Ping, 0D
Zheng, Yi, 0D
Zhong, Lingling, 3Z
Zhong, Wei, 46
Zhou, Zuofeng, 3E, 4U, 55, 5J, 5T
Zhou, Chengfeng, 4A
Zhou, Dianle, 6B
Zhou, Haiyang, 2H
Zhou, Hangcheng, 6I
Zhou, Hongbin, 68
Zhou, Hongyi, 0L
Zhou, Jiankang, 3K
Zhou, Jinghui, 24
Zhou, Mali, 12
Zhou, Mei, 34
Zhou, Qian, 2M, 40
Zhou, Qizhen, 16
Zhou, Shizhe, 4A
Zhou, Yong, 1I
Zhou, Yuan, 6G
Zhu, Hongwei, 0P
Zhu, Junwei, 2K, 2K
Zhu, Ming, 3X
Zhu, Qing, 3F
Zhu, Weigang, 3I, 5U, 6T
Zhu, Xianyi, 4A
Zhu, Xinyan, 2H
Zhu, Xiuhong, 1A, 1O
Zhu, Yuesheng, 1J
Zhu, Ziyao, 6I
Zhuang, Huixiang, 5N
Zhuang, Zhemin, 3B, 41, 5E
Zou, Chang, 0W, 52
Zuo, Yongyan, 72

Conference Committee

Honorary Chairs

Yongqi Xue, Shanghai Institute of Technical Physics of the Chinese Academy of Sciences (China)

Junhao Chu, East China Normal University (China)

International Advisory Committee

Chin-Chen Chang, Feng Chia University (Taiwan, China)

Osamu Matoba, Kobe University (Japan)

Conference Chairs

Pengfei Shi, Shanghai Jiaotong University (China)

Yue Lv, East China Normal University (China)

Xudong Jiang, Nanyang Technological University (Singapore)

Jenq-Neng Hwang, University of Washington (United States)

Program Committee Chairs

Qingli Li, East China Normal University (China)

Jamshid Dehmeshki, Kingston University (United Kingdom)

Konstantin Romyantsev, Southern Federal University (Russian Federation)

Ismail Rakip Karas, Karabük University (Turkey)

Publicity Chairs

Yuri Rzhanov, University of New Hampshire (United States)

Piotr Boniecki, Poznan University of Life Sciences (Poland)

Krzysztof Koszela, Poznan University of Life Sciences (Poland)

Technical Committee

Liming Zhang, University of Macau (Macao, China)

Jinfeng Yang, Civil Aviation University of China (China)

Yong-Sheng Chen, National Chiao Tung University (Taiwan, China)

Tarek Sobh, University of Bridgeport (United States)

Mueller Wojciech, Poznan University of Life Sciences (Poland)

Srikanta Murthy, PES School of Engineering (India)

Radosław Jan Kozłowski, Poznan University of Life Sciences (Poland)

Gniewko Niedbała, Poznan University of Life Sciences (Poland)

Bicheng Li, Information Engineering University (China)
Lixiong Liu, Beijing Institute of Technology (China)
Fulin Su, Harbin Institute of Technology (China)
Zhi Liu, Shanghai University (China)
Bin Tang, University of Electronic Science and Technology of China (China)
Xiaoyong Lei, Beihang University (China)
En-Bing Lin, Central Michigan University (United States)
Huimin Ma, Tsinghua University (China)
Juncheng Li, Hunan University of Humanities, Science, and Technology (China)
Mingzhe Liu, Chengdu University of Technology (China)
Muhammad Naufal Bin Mansor, Universiti Malaysia Perlis (Malaysia)
George A. Papakostas, Eastern Macedonia and Thrace Institute of Technology (Greece)
Zhi Jia Zhang, Shenyang University of Technology (China)
Tianqing Peng, Henan Institute of Engineering (China)
Tieling Chen, University of South Carolina, Aiken (United States)
Hong Lu, Nanjing Institute of Technology (China)
Florence Cloppet, Université Paris Descartes (France)
Momina Moetesum, Bahria University (Pakistan)
Imran Siddiqi, Bahria University (Pakistan)
Bin Yan, National Digital Switching System Engineering and Technological Research Center (China)
Wu Xi, Xihua University (China)
Wu-Hsiung Chen, Pano Leader Company, Ltd. (Taiwan, China)
Hengjian Li, Shandong Computer Science Center (China)
Sergey Kravtsov, Southern Federal University (Russian Federation)
Konstantin Rumyantsev, Southern Federal University (Russian Federation)
Yan Yang, Southwest Jiaotong University (China)
Sherif Welsen, University of Nottingham Ningbo (China)
Ningyu Zhang, Shandong Jianzhu University (China)
Shouhong Wan, University of Science and Technology of China (China)
Chunning Meng, China Maritime Police Academy (China)
Jenq-Neng Hwang, University of Washington (United States)
Hua-Tsung Chen, National Chiao Tung University (Taiwan, China)
Ahmed A. Abd El-Latif, Menoufia University (Egypt)
Mark Richard Pickering, The University of New South Wales (Australia)
Hongping Li, Ocean University of China (China)
Huiqin Jiang, Zhengzhou University (China)
Tao Wu, Lingnan Normal University (China)
Kathiravan Srinivasan, National Ilan University (Taiwan, China)
Liu Zhen, National University of Defense Technology (China)
Yigang Zhou, Harbin Institute of Technology (China)
Xibin Jia, Beijing University of Technology (China)
Fengqi Li, Dalian University of Technology (China)
Wenbing Tao, Huazhong University of Science and Technology (China)

Nicole Vincent, Université Paris Descartes (France)
Ahmed Nashat, Fayoum University (Egypt)
Zhihua Xie, Jiangxi Science and Technology Normal University (China)
Kuo-Liang Chung, National Taiwan University of Science and Technology (Taiwan, China)
G. Balakrishnan, Indra Ganesan College of Engineering (India)
Peng Wang, Tsinghua University (China)
Juan Li, Beijing Jiaotong University (China)
Jing Hu, Chengdu University of Information and Technology (China)
Hung Nguyen, Japan Advanced Institute of Science and Technology (Japan)
Yangming He, Jiangxi University of Traditional Chinese Medicine (China)
Bing Li, State Key Laboratory of Complex Electromagnetic Environmental Effects on Electronics and Information Systems (China)
Fei Xia, Shanghai University of Electric Power (China)
Lifeng Zhang, North China Electric Power University (China)
Dongming Zhou, Yunnan University (China)
Junzhou Zou, East China University of Science and Technology (China)
Wenchao Cui, China Three Gorges University (China)
Hong Zhang, Armstrong State University (United States)
Suyu Wang, Beijing University of Technology (China)
Shua Lu, Jilin University (China)
Dongmei Fu, University of Science and Technology Beijing (China)
Yangming He, Jiangxi University of Traditional Chinese Medicine (China)
Peiyuan Guo, Beijing Technology and Business University (China)
Albert Chong, University of Southern Queensland (Australia)
Yebin Liu, Tsinghua University (China)
Lizhuang Ma, Shanghai Jiao Tong University (China)
Hongtao Xie, Chinese Academy of Sciences (China)
Tao Lei, Chinese Academy of Sciences (China)
Wen He, Chengdu Medical College (China)
Chi-Man Pun, University of Macau (Macao, China)
Zhen Liu, Ningbo University (China)
Guowang Jin, Zhengzhou Institute of Surveying and Mapping (China)
Hu Zheng, National University of Defense Technology (China)
Xiangyang Hao, Information Engineering University (China)
Maciej Zaborowicz, Poznan University of Life Sciences (Poland)
Yusnaidi Md Yusof, Universiti Teknologi Malaysia (Malaysia)
Kefiloe Maboe, University of South Africa (South Africa)
Kin Hong Wong, The Chinese University of Hong Kong (Hong Kong, China)
Ruofei Zhong, Capital Normal University (China)
Kaixia Wei, Nanjing Xiaozhuang University (China)
Zhenzhou Wang, Chinese Academy of Sciences (China)
Zhongjun Zhang, Beijing Normal University (China)
Yongqi Sun, Beijing Jiaotong University (China)
Yan-Guo Wang, China Academy of Railway Sciences (China)
Wangmeng Zuo, Harbin Institute of Technology (China)

Manhua Liu, Shanghai Jiao Tong University (China)
Fan Zhao, Xi'an University of Technology (China)
Zhenghao Shi, Xi'an University of Technology (China)
Linbo Qing, Sichuan University (China)
Changwen Zheng, University of Chinese Academy of Sciences (China)
Wen-Jye Shyr, National Changhua University of Education
(Taiwan, China)
Terumasa Aoki, Tohoku University (Japan)
Ye Long, Communication University of China (China)
Xing-Peng Mao, Harbin Institute of Technology (China)
Jiwei Hu, Wuhan University of Technology (China)
Xinyu Du, China Academy of Railroad Sciences (China)
Mingtao Li, Chinese Academy of Sciences (China)
Jiangming Kan, Beijing Forestry University (China)
Hongping Zhou, Hefei University of Technology (China)
Guoliang Lu, Shandong University (China)
Linlin Shen, Shenzhen University (China)
Weihai Li, University of Science and Technology of China (China)
Lihua Yue, University of Science and Technology of China (China)
Yun Zhang, Kunming University of Science and Technology (China)
Wenhui Lang, Hefei University of Technology (China)
Yuesheng Zhu, Peking University (China)
Bin Yan, National Digital Switching Center (China)
Lisheng Wang, Shanghai Jiao Tong University (China)
Zhitao Xiao, Tianjin Polytechnic University (China)
Yun Tie, Zhengzhou University (China)
Tianyang Wang, Southern Illinois University, Carbondale (United States)
Zhengrui Qin, Northwest Missouri State University (United States)
Rencan Nie, Yunnan University (China)
Yuanyu Wang, Taiyuan University of Technology (China)
Bing Xiao, Shaanxi Normal University (China)
K. Ravindra, Malla Reddy Institute of Technology and Science (India)
Yan Qiang, Taiyuan University of Technology (China)
Anusha Achuthan, Universiti Sains Malaysia (Malaysia)
Jiangping Hu, University of Electronic Science and Technology of China
(China)
Umair Ali Khan, Fraunhofer Institute for Integrated Circuits (Germany)
Guoyuan Liang, Chinese Academy of Sciences (China)
Wei-Ping Zheng, South China Normal University (China)
Bingwei He, Fuzhou University (China)
Guang Yang, Beihang University (China)
Zhaoxia Xie, Beijing Institute of Graphic Communication (China)
Ying Liu, Xi'an University of Posts and Telecommunications (China)
Meichun Yan, Hohai University (China)
Hengjian Li, University of Jinan (China)
Hongzhi Wu, Shandong Institute for Development Strategy of Science
and Technology (China)

Ying Wang, Qingdao University (China)
Yang Jia, Xi'an University of Posts and Telecommunications (China)
Junjun Xiao, Harbin Institute of Technology (China)
Zhuozheng Wang, Beijing University of Technology (China)
Yin Long Wang, The Fifth Department of OEC (China)
Wei Xiong, Hubei University of Technology (China)
Jungang Han, Xi'an University of Posts and Telecommunications (China)
Shruti Bhargava Choubey, Sreenidhi Institute of Science and Technology (India)
Shi Jun, Shanghai JianQiao University (China)
Souvik Pal, Elite College of Engineering (India)
Zhaodong Niu, National University of Defense Technology (China)
Netra Lokhande, MIT College of Engineering Kothrud (India)
Yonghua Zhu, Shanghai University (China)
Wenxing Bao, North Minzu University (China)
Yongfeng Qi, Northwest Normal University (China)
Yigang Wang, Hangzhou Dianzi University (China)
Yufeng Nie, Northwestern Polytechnical University (China)
Ying Wen, East China Normal University (China)
Xiuli Ma, Shanghai University (China)
Qiaosong Chen, Chongqing University of Posts and Telecommunications (China)
Zhiwei He, Hangzhou Dianzi University (China)
Bai Lin, Chang'an University (China)
Jingjing Si, Yanshan University (China)
Yu Zhang, Hangzhou Dianzi University (China)
Weidong Pan, University of Chinese Academy of Sciences (China)
Zhong-Gui Sun, Liaocheng University (China)
Zuochang Ye, Tsinghua University (China)
Yong Tan, Yangtze Normal University (China)
Xiaofeng Zhao, Xi'an High Tech Institute (China)
Wei Cai, Xi'an High Tech Institute (China)
Li Zhan Li, Xi'an University of Science and Technology (China)
Congli Li, Army Academy of Artillery and Air Defense (China)
Jiwei Hu, Wuhan University of Technology (China)
Peiquan Jin, University of Science and Technology of China (China)
Hao Liu, Southern Medical University (China)
Yohei Fukumizu, Ritsumeikan University (Japan)
Yun Li, Yangzhou University (China)
Yun-Hao Yuan, Yangzhou University (China)
Zhemin Zhuang, Shantou University (China)
Cheng Han, Changchun University of Science and Technology (China)
Weihai Li, University of Science and Technology of China (China)
Xiaobo Lu, Southeast University (China)
Aiwen Jiang, Jiangxi Normal University (China)
Weiji He, Nanjing University of Science and Technology (China)
Wen Liu, Wuhan University of Technology (China)

Hongzhi Wu, Shandong Institute for Development Strategy of Science and Technology (China)
Bo Qiang, TaiYuan Satellite Launch Center (China)
Zhangjin Huang, University of Science and Technology of China (China)
Qing Zhu, Beijing University of Technology (China)
András Horváth, Peter Pazmany Catholic University (Hungary)
Feifei Tang, Chongqing Jiaotong University (China)
Zhu Li, Hangzhou Dianzi University (China)
Bin Li, University of Science and Technology of China (China)
Fengying Xie, Beihang University (China)
Jiande Sun, Shandong Normal University (China)
Songjiang Lou, Zhejiang University of Science and Technology (China)
Guoyou Wang, Huazhong University of Science and Technology (China)
Songtao Liu, Dalian Naval Academy (China)
Qingsheng Liu, Chinese Academy of Sciences (China)
Volodymyr Hnatushenko, Oles Gonchar Dnipro National University (Ukraine)
Dmitriy Mozgovoy, Oles Gonchar Dnipro National University (Ukraine)
Ling Ma, Zhengzhou University (China)
Youdong Ding, Shanghai University (China)
Guoye Chen, Akita Prefectural University (Japan)
Guanzhen Yu, Longhua Hospital Affiliated to Shanghai University of Traditional Chinese Medicine (China)
Guodong Zhang, Shenyang Aerospace University (China)
Kyeong-Seop Kim, Kon-kuk University (Korea, Republic of)
Ruijun Zhang, Wuhan University of Science and Technology (China)
Yong Wang, Harbin Institute of Technology (China)
Vladislav Sergeev, Samara National Research University (Russian Federation)
Fan Zhang, Anhui Xinhua University (China)
Houde Dai, Quanzhou Institute of Equipment Manufacturing, Haixi Institutes, CAS (China)
Zhenzhou Yu, Jilin University (China)
Jun Cai, Anhui University of Science and Technology (China)
Hung-Min Sun, National Tsing Hua University (Taiwan, China)
Xuefeng Lv, National Disaster Reduction Center of China (China)
Xiaoying Wang, Qinghai University (China)
Zheng Han, Chifeng University (China)
Zhen Ye, Chang'an University (China)

Introduction

We had the great honor of organizing the Tenth International Conference on Digital Image Processing (ICDIP 2018). It was truly a great pleasure for us to greet more than 280 participants from many different countries. We firmly believe that ICDIP will become an important international event in the field of Digital Image Processing.

The Tenth International Conference on Digital Image Processing (ICDIP 2018) was co-sponsored by Shanghai Key Laboratory of Multidimensional Information Processing (China) and International Association of Computer Science and Information Technology (Singapore, hosted by East China Normal University (China), and technically assisted by many universities and institutes.

The objective of this conference was to provide a platform for the participants to report and exchange innovative ideas, up-to-date progress and developments, and discuss novel approaches to application in the digital image processing field. It is sincerely hoped that the research and development in digital image processing will be improved, and the international collaboration with common interest sharing will be enhanced.

On behalf of other co-chairs, and the organization committee of ICDIP 2018, we would like to express our heartfelt thanks to our sponsors and cooperating organizers for all they have done. Thanks also go to all the authors for their contributions to the proceedings, to all of the participants and friends for their interest and efforts in helping us to make it possible, to the program technical committee for their effective work and valuable advice, especially the conference secretary, and to the staff at SPIE for their tireless efforts and outstanding service in preparing and publishing the proceedings.

Xudong Jiang
Jenq-Neng Hwang

