First International Workshop on Pattern Recognition

Xudong Jiang
Guojian Chen
Genci Capi
Chiharu Ishii
Editors

11–13 May 2016
Tokyo, Japan

Organized by
Hainan University (China)

Sponsored by
Hosei University (Japan)

Published by
SPIE

Volume 10011
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:


ISSN: 0277-786X
ISSN: 1996-756X (electronic)
ISBN: 9781510604308

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 © 2016, 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/16/$18.00.

Printed in China.

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

vii Authors
ix Conference Committees
xiii Introduction

SESSION 1 TARGET DETECTION AND TRACKING

10011 02 Research on target tracking based on improved SURF algorithm and Kalman prediction [10011-42]
10011 03 Object tracking via background subtraction for monitoring illegal activity in crossroad [10011-48]
10011 04 Development of the rounded objects automatic detection method for the log deck volume measurement [10011-14]
10011 05 Hierarchical detection of rectangles in images [10011-13]
10011 06 Improved moving object detection and tracking method [10011-49]
10011 07 Pedestrian detection based on diverse margin distribution ensemble [10011-59]
10011 08 Approach to part using deformable part model in pedestrian detection system [10011-55]

SESSION 2 FACE RECOGNITION

10011 09 Real-time robust face recognition using weight-incorporated LBP [10011-38]
10011 0A Effects of training set selection on pain recognition via facial expressions [10011-9]
10011 0B Semi-automatic identification photo generation with facial pose and illumination normalization [10011-62]
10011 0C Face liveness detection for face recognition based on cardiac features of skin color image [10011-27]
10011 0D Face verification system for Android mobile devices using histogram based features [10011-69]

SESSION 3 VIDEO PROCESSING AND VISUALIZATION

10011 0E Decoding figure-ground occlusions from contours and shading [10011-35]
SESSION 4 MEDICAL IMAGE ANALYSIS AND PROCESSING

10011 0I The application of decision trees algorithm for selecting the area of the left ventricle on echocardiographic images [10011-28]
10011 0J Tongue's substance and coating recognition analysis using HSV color threshold in tongue diagnosis [10011-25]
10011 0K Dendritic cell recognition using template matching based on one-dimensional (1D) Fourier descriptors (FD) [10011-39]
10011 0L Quantitative ultrasound venous valve movement: early diagnosis of deep vein thrombosis [10011-40]
10011 0M Unsupervised EEG analysis for automated epileptic seizure detection [10011-71]

SESSION 5 IMAGE PROCESSING AND APPLICATIONS

10011 0N A depth-based super-resolution method for multi-view color images [10011-37]
10011 0O Robustifying blind image deblurring methods by simple filters [10011-44]
10011 0P Towards a robust HDR imaging system [10011-45]
10011 0Q A consistent approach for image de-noising using spatial gradient based bilateral filter and smooth filtering [10011-19]
10011 0R An approach for visibility improvement of dark color images using adaptive gamma correction and DCT-SVD [10011-47]
10011 0S Weighted feature fusion for content-based image retrieval [10011-52]
10011 0T Air-touch interaction system for integral imaging 3D display [10011-66]
10011 0U 3D point cloud registration based on the assistant camera and Harris-SIFT [10011-56]
10011 0V One-click scanning of large-size documents using mobile phone camera [10011-41]
10011 0W Convolutional neural network features based change detection in satellite images [10011-72]
10011 0X Steel surface in-line inspection using machine vision [10011-54]
### SESSION 6 ROBOTICS AND MACHINE VISION

| 10011 0Y | Challenges facing the development of the Arabic chatbot [10011-7] |
| 10011 0Z | Indoor scene classification of robot vision based on cloud computing [10011-63] |
| 10011 10 | Development of coffee maker service robot using speech and face recognition systems using POMDP [10011-70] |
| 10011 11 | A new approach of active compliance control via fuzzy logic control for multifingered robot hand [10011-36] |
| 10011 12 | Force Sensing Resistor (FSR): a brief overview and the low-cost sensor for active compliance control [10011-51] |
| 10011 13 | Blind speech separation system for humanoid robot with FastICA for audio filtering and separation [10011-58] |
| 10011 14 | Using intelligent controller to enhance the walking stability of bipedal walking robot [10011-61] |
| 10011 15 | Pose estimation of occluded objects with an improved template matching method [10011-29] |
| 10011 16 | Automated packaging employing real-time vision [10011-68] |

### SESSION 7 SIGNAL ANALYSIS AND PROCESSING

| 10011 17 | Learning high-level features for chord recognition using Autoencoder [10011-22] |
| 10011 18 | Chaotic background phase matching signal separation method [10011-6] |
| 10011 19 | A combination approach for compressed sensing signal reconstruction [10011-43] |
| 10011 1A | Compressed domain ECG biometric with two-lead features [10011-31] |
| 10011 1B | Low-cost assistive device for hand gesture recognition using sEMG [10011-60] |
| 10011 1C | Sound-event classification using pseudo-color CENTRIST feature and classifier selection [10011-21] |
| 10011 1D | Mining discriminative class codes for multi-class classification based on minimizing generalization errors [10011-18] |

### SESSION 8 COMPUTER APPLICATIONS

| 10011 1E | Distance-based classification of keystroke dynamics [10011-12] |
| 10011 1F | Sentiment analysis of Arabic tweets using text mining techniques [10011-16] |
10011 1G  Encrypted data stream identification using randomness sparse representation and fuzzy Gaussian mixture model [10011-23]
10011 1H  Calibration of multiple Kinect depth sensors for full surface model reconstruction [10011-10]
10011 1I  Cross domains Arabic named entity recognition system [10011-8]
10011 1J  Detecting nonsense for Chinese comments based on logistic regression [10011-20]
10011 1K  The neighborhood MCMC sampler for learning Bayesian networks [10011-30]
10011 1L  Development of an indoor positioning and navigation system using monocular SLAM and IMU [10011-50]
10011 1M  Navigation system for a small size lunar exploration rover with a monocular omnidirectional camera [10011-46]
10011 1N  Fast brain control systems for electric wheelchair using support vector machine [10011-57]
Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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...0Z, followed by 10-1Z, 20-2Z, etc.

Abdellatif, Mohamed, 0S
Abdul Salam, Rosalina, 0G
Abdullatif Al-Johar, B., 1I
Abdulrahim, Khairi, 0G
Ahmed, A., 11
Al-Ahmari, S. Saad, 1I
Al-Hagbayani, Eman Saad, 0Y
Al-Horaibi, Lamia, 1F
Al-Smadi, Ma'moun, 0G
Alyami, Salem A., 1K
Anstis, Stuart, 0E
Azad, A. K. M., 1K
Babaguchi, Noboru, 05
Birjandtalab, Javad, 0M
Bobkov, V. V., 0I
Bobkova, A. O., 0I
Britton, Nathan J., 1M
Budiharto, Widodo, 10, 13, 1N
Cavarelli, Xavier, 1M
Chang, Chia-Der, 14
Chang, Wen-Chung, 0M
Chang, Wen-Whei, 1A
Chen, Gaoxing, 0H
Chen, Wang, 18
Chen, Wen-Shiung, 09
Cheng, Fanyong, 07
Choi, Hye Ji, 08
Choi, Kwang Nam, 08
Cruciani, Silvia, 1M
Cymbalak, David, 1B
Dong, Han Yuan, 0T
Eiadon, Mongkon, 1D
Fan, Jun, 0N, 0O
Fecil'ak, Peter, 1B
Feng, Jing, 0N, 0O, 0P
Ghimire, Deepak, 03
Guang, Chen, 1J
Gupta, Bhupendra, 0Q, 0R
Hasan, Mohamed, 0S
Hou, Rui, 1G
Hsieh, Lili, 09
Hsieh, Tsung-Che, 14
Hu, Dandan, 02
Hu, Tao, 0Z
Huangpeng, Qizi, 0N, 0O, 0P
Hui, Xia, 18
Ibrahim, Nabilah, 0L
Ikenaga, Takeshi, 0H
Jakab, František, 1B
Jalani, J., 11, 12
Jamil, M. F. A., 11
Jeng, Ren-He, 09
Jeong, Sung-Hwan, 03
Jiang, Bo, 0B, 0V
Jiang, Xudong, 1C
Kainz, Ondrej, 1B
Kam, Ho Chuen, 1H
Kamarudin, Nur Diyana, 0J
Kamonsantoj, Suwatchai, 17, 1D
Kardoš, Slavomír, 1B
Kawanabe, Tadaaki, 0J
Keith, Jonathan M., 1K
Khan, Mohammad Badruddin, 0Y, 1F
Kim, Juno, 0E
Kobayashi, Kazuhiro, 0D
Kruglov, Artem V., 04
Lai, Ying-Chih, 1L
Lainé, Mickaël, 1M
Lamba, Subir Singh, 0R
Lan, Yu-Ying, 0X
Lau, Mei Xia, 0K
Lee, Byung Geok, 0T
Lee, Eui Chul, 0C
Lee, Han-Wen, 0X
Lee, Joon whoan, 03
Lee, Wan-Jou, 1A
Li, Hong-an, 06
Li, Shipei, 0Z
Li, Zhanli, 06
Li, Zuoyong, 07
Liu, Ding-Kun, 0X
Liu, Hsiao-Wei, 0X
Liu, Qingjie, 0W
Liu, Sijiang, 0B, 0V
Liu, Yan, 0O
Liu, Z. Y., 15
Liu, Zhenyu, 0H
Long, Xin, 0P
Mai, Yu-Ching, 1L
Meng, Juan, 1G
Mi, Xiaoyu, 0J
Mohammed El Amin, Arabi, 0W
Muhd Suberi, Anis Azwani, 0K, 0L
Mukhtarov, A. A., 0I
Nan, Jiang, 02
Nourani, Mehrdad, 0M
Conference Committees

**International Advisory Committee**

Xiaohong Yuan, North Carolina Agricultural and Technical University (United States)

**Conference Chairs**

Xudong Jiang, Nanyang Technological University (Singapore)
Guojian Chen, Hainan University (China)
Genci Capi, Hosei University (Japan)
Chiharu Ishii, Hosei University (Japan)

**Technical Program Committee Chairs**

Christopher Nwosisi, The College of Westchester (United States) and Pace University (United States)
Masayuki Arai, Teikyo University (Japan)
Siva Yellampalli, VTU Extension Center, UTL Technologies Ltd. (India)

**Technical Program Committee**

Juno Kim, The University of New South Wales (Australia)
Sijiang Liu, Nanjing University of Posts and Telecommunications (China)
Sergey Porshnev, Ural Federal University (Russian Federation)
Kin Hong Wong, The Chinese University of Hong Kong (Hong Kong, China)
Badr Aljohar, King Faisal University (Saudi Arabia)
Svetlana Yanushkevich, University of Calgary (Canada)
Wei Jia, Hefei University of Technology (China)
Yong Tsui Lee, Nanyang Technological University (Singapore)
M. Fatih Demirci, TOBB University of Economics and Technology (Turkey)
Rami Alazrai, German-Jordanian University (Jordan)
Eric Anquetil, Institut National des Sciences Appliquées (France)
Xianfang Sun, Cardiff University (United Kingdom)
Caiming Zhong, Ningbo University (China)
Mehrdad Nourani, The University of Texas at Dallas (United States)
Reinhard Klette, Auckland University of Technology (New Zealand)
Adrian Bors, University of York (United Kingdom)
Liping Wang, Aberystwyth University (United Kingdom)
Kuo-Chin Fan, National Central University (Taiwan)
Zhisong Pan, PLA University of Science and Technology (China)
Rosalina Abdul Salam, Universiti Sains Islam Malaysia (Malaysia)
Takeshi Ikenaga, Waseda University (Japan)
Wan Nurshazwani Wan Zakaria, Universiti Tun Hussein Onn Malaysia (Malaysia)
Deepak Ghimire, Korea Electronics Technology Institute (Korea, Republic of)
Byung Gook Lee, Dongseo University (Korea, Republic of)
Jonathan M. Keith, Monash University (Australia)
Bo Jiang, Nanjing University of Posts and Telecommunications (China)
Jarbas Joaci de Mesquita Sá Junior, Federal Universidade of Ceará (Brazil)
Stefanos Kollias, National Technical University of Athens (Greece)
Julia Sidorova, Blekinge Institute of Technology (Sweden)
Guillaume Cleuziou, Université d’Orléans (France)
Wanquan Lu, Curtin University (Australia)
Yau Hee Kho, Nazarbayev University (Kazakhstan)
K. Seetharaman, Anna University (India)
Wen-Shiung Chen, National Chi Nan University (Taiwan)
Mohammed Imran, University of Damam (Saudi Arabia)
Zeng Xiangrong, National University of Defense Technology (China)
Liqiang Nie, National University of Singapore (Singapore)
Francisco Herrera, Universidad de Granada (Spain)
Ming-Shen Jian, National Formosa University (Taiwan)
Julian Fierrez, Universidad Autonoma de Madrid (Spain)
Iickho Song, Korea Advanced Institute of Science and Technology (Korea, Republic of)
Marina Ivasic-Kos, University of Rijeka (Croatia)
Giuseppe Serra, Università degli Studi di Modena e Reggio Emilia (Italy)
Emre Sümer, Başkent University (Turkey)
Bhupendra Gupta, Indian Institute of Information Technology, Design and Manufacturing, Jabalpur (India)
Luepol Pipanmaekapom, King Mongkut's University of Technology North Bangkok (Thailand)
Kuo-Liang Chung, National Taiwan University of Science and Technology (Taiwan)
Chih-Yi Chiu, National Chiayi University (Taiwan)
Zhunga Liu, Northwestern Polytechnical University (China)
Michele Nappi, Università degli Studi di Salerno (Italy)
Andrew B. J. Teoh, Yonsei University (Korea, Republic of)
Anastasios Tefas, Aristotle University of Thessaloniki (Greece)
Xiaoyi Jiang, Universität Münster (Germany)
Giovanni Maria Farinella, Università degli Studi di Catania (Italy)
Muhammad Badruddin Khan, Al-Imam Muhammad Ibn Saud Islamic University (Saudi Arabia)
Jin Young Choi, Seoul National University (Korea, Republic of)
M. L. Dennis Wong, Swinburne University of Technology (Australia)
Wen-Fang Xie, Concordia University (Canada)
Filippo Stanco, Università degli Studi di Catania (Italy)
Alaa Halawani, Umeå Universitet (Sweden)
Qiu Chen, Kogakuin University (Japan)

Session Chairs

1. **Object Detection and Pattern Recognition**
   - Magne Jørgensen, Universitetet i Oslo (Norway)
   - Xiaohong Yuan, North Carolina Agricultural and Technical University (United States)

2. **Image Analysis and Signal Processing**
   - Chiharu Ishii, Hosei University (Japan)
   - Carsten Mueller, University of Economics (Czech Republic)

3. **Computer and Information Technology**
   - Christopher Nwosisi, The College of Westchester (United States)
     and Pace University (United States)

4. **Computer Theory and Application**
   - Kin Hong Wong, The Chinese University of Hong Kong
     (Hong Kong, China)

5. **Robotics and Computer Vision**
   - Xudong Jiang, Nanyang Technological University (Singapore)

6. **Data Mining and Software Engineering**
   - Genci Capi, Hosei University (Japan)
Introduction

In recent years, pattern recognition has become a hot research branch in the field of machine learning. In light of the fast-paced advancements in pattern recognition taking place all over the world, it is of interest to keep an eye on the state-of-the-art research and development and to facilitate collaboration in multidisciplinary research areas. With this end in view, the First International Workshop on Pattern Recognition was held on 11–13 May 2016 in Tokyo, Japan.

The aim of the conference was to address and deliberate on the latest technical status and recent trends in the research and applications of pattern recognition. This conference was designed to provide an opportunity for scientists, engineers, industrialists, students, and other professionals from all over the world to interact and exchange their new ideas and research outcomes for future collaboration.

This year, IWPR solicited 110 submitted papers from different countries all over the world. These proceedings contain 58 selected papers which were presented orally or via poster sessions at the conference. They provide up-to-date, comprehensive and worldwide state-of-the-art knowledge in this field. The proceedings cover the following specific areas: target detection and tracking, face recognition; video processing and visualization; medical image analysis and processing; image processing and application; robot and machine vision; signal analysis and processing; and computer applications.

On behalf of the organizing committee, we’d like to express our heartfelt gratitude to all the reviewers for their great professionalism and efforts. We’d also like to thank all the participants and sponsors for their valuable contributions and support of IWPR 2016.

Xudong Jiang
Guojian Chen
Genci Capi
Chiharu Ishii