PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10613

, "Front Matter: Volume 10613," Proc. SPIE 10613, 2017 International Conference on Robotics and Machine Vision, 1061301 (19 December 2017); doi: 10.1117/12.2314520

SPIE.

Event: Second International Conference on Robotics and Machine Vision, 2017, Kitakyushu, Japan

PROCEEDINGS OF SPIE

2017 International Conference on Robotics and Machine Vision

**Chiharu Ishii
Genci Capi
Jianhong Zhou**
Editors

**15–18 September 2017
Kitakyushu, Japan**

Organized and Sponsored by
Hosei University (Japan)
Xihua University (China)

Published by
SPIE

Volume 10613

Proceedings of SPIE 0277-786X, V. 10613

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

2017 International Conference on Robotics and Machine Vision, edited by
Chiharu Ishii, Genci Capi, Jianhong Zhou, Proc. of SPIE Vol. 10613, 1061301
© 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2314520

Proc. of SPIE Vol. 10613 1061301-1

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 *2017 International Conference on Robotics and Machine Vision*, edited by Chiharu Ishii, Genci Capi, Jianhong Zhou, Proceedings of SPIE Vol.10613 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

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

ISBN: 9781510617308
ISBN: (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 © 2017, 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/17/\$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

v	<i>Authors</i>
vii	<i>Conference Committees</i>
ix	<i>Introduction</i>

OBJECT DETECTION AND PATTERN RECOGNITION

10613 02	Relative velocity discretization for moving targets detection in FMCW SAR [10613-12]
10613 03	Binary image filtering for object detection based on Haar feature density map [10613-23]
10613 04	Posture recognition associated with lifting of heavy objects using Kinect and Adaboost [10613-26]
10613 05	A comparison between skeleton and bounding box models for falling direction recognition [10613-28]
10613 06	Illumination robust face recognition using spatial adaptive shadow compensation based on face intensity prior [10613-4]
10613 07	Parking-lines detection based on an improved Hough transform [10613-21]

IMAGE PROCESSING AND APPLICATIONS

10613 08	Feature extraction of the wafer probe marks in IC packaging [10613-10]
10613 09	Multi-focus image fusion algorithm based on non-subsampled shearlet transform and focus measure [10613-19]
10613 0A	Spatial and spectral analysis of corneal epithelium injury using hyperspectral images [10613-8]
10631 0B	Virtual expansion of the technical vision system for smart vehicles based on multi-agent cooperation model [10613-13]
10613 0C	Acceleration of planes segmentation using normals from previous frame [10613-6]

MODERN INFORMATION THEORY AND SIGNAL PROCESSING

10613 0D	Advertisement recognition using mode voting acoustic fingerprint [10613-30]
10613 0E	Adaptive EMG noise reduction in ECG signals using noise level approximation [10613-9]

- 10613 OF **A novel ECG data compression method based on adaptive Fourier decomposition** [10613-11]
- 10613 OG **Structural damage detection based on wavelet transform in strain energy signal processing** [10613-16]
- 10613 OH **Modeling and prediction of human word search behavior in interactive machine translation** [10613-15]
- 10613 OI **An 1.4 ppm/°C bandgap voltage reference with automatic curvature-compensation technique** [10613-17]
- 10613 OJ **Differential effects of gender on entropy perception** [10613-3]

ROBOT DESIGN AND CONTROL ENGINEERING

- 10613 OK **Image registration algorithm for high-voltage electric power live line working robot based on binocular vision** [10613-22]
- 10613 OL **A formation control strategy with coupling weights for the multi-robot system** [10613-27]
- 10613 OM **Implementation and performance evaluation open-source controller for precision control of gripper** [10613-29]
- 10613 ON **Research on key technology of prognostic and health management for autonomous underwater vehicle** [10613-5]
- 10613 OO **Intelligent navigation and accurate positioning of an assist robot in indoor environments** [10613-31]
- 10613 OP **Structural optimization of Beach-Cleaner snatch mechanism** [10613-7]

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.

Abduraimov, Azizbek, 0C	S., Ramakrishnan, 04
Abedi Firozjaee, Hosein, 0D	Safavi, Saeid, 0D
Ahmed, Mir Soban, 09	Saranovac, Lazar, 0E
An, Qinghao, 0K	Satcharoen, Kleddao, 0J
Capi, Genci, 0O	Seidakhmet, Askar, 0C
Chen, Yuan, 07	Senchenko, Roman, 0B
Cheng, Pu, 02	Shi, Yue, 0I
Fahmi, Reza, 0D	Srisisawang, Nitikorn, 05
Fan, Kuo-Chin, 06	Tan, Chunyu, 0F
Gritsenko, Igor, 0C	Tsai, Cheng-Yu, 08
Gritsenko, Pavel, 0C	Tsuri, Yosuke, 0O
Ham, Un-Hyeong, 0M	Wan, Jianwei, 02
Han, Chin-Chuan, 06	Wang, Chau-Shing, 08
Hsieh, Cheng-Ta, 06	Wang, Fang, 0P
Hua, Bin, 0O	Wang, Hongmei, 09
Huang, Kae-Horng, 06	Wang, Pengbo, 0G
Janalizadeh Choobbasti, Ali, 0D	Wang, Siming, 0L
Ji, Dou, 0H	Wei, Qin-rui, 0P
Jiang, Shuyu, 07	Xin, Qin, 02
Jindai, Mitsuru, 0O	Xu, Ke, 02
Jung, Hak-Sang, 0M	Yang, Bo, 03, 0K
Jung, Il Kyun, 0M	Ye, Na, 0H
Kao, Chen-Ting, 08	Yu, Bao, 0H
Kamenov, Nikolay, 0B	Yu, Hongming, 0I
Krapukhina, Nina, 0B	Yu, Xiangru, 0K
Lee, Chang-Hsing, 06	Zhang, Bo, 0I
Lee, Seung-Yong, 0M	Zhang, Liming, 0F
Li, Chengqi, 03, 0K	Zhao, Yuan-jiang, 0P
Li, Jinping, 0K	Zhou, Shui-ting, 0P
Li, Weijie, 0L	Zhou, Zekun, 0I
Liang, Xudong, 0L	Zhou, Zhi, 0N
Lim, Sun, 0M	Zou, Xionggao, 07
Lin, Chia-Te, 08	
Lu, Yinan, 07	
M., Navaneethakrishna, 04	
Ma, Bin, 0H	
Marouf, Mohamed, 0E	
Marshall, Stephen, 0A	
Md Noor, Siti Salwa, 0A	
Michael, Kaleena, 0A	
Mortazavi Najafabadi, S. H. E., 0D	
Narupiyakul, Lalita, 05	
Ouyang, Lian-ge, 0P	
Park, Young-Woo, 0M	
Peng, Qian, 0P	
Rama, Endri, 0O	
Raut, Sayli, 04	
Ren, Jinchang, 0A	
Ren, Zhigang, 03, 0K	

Conference Committees

Advisory Committee

Danil Prokhorov, International Neural Network Society
Klaus-Dieter Kuhnert, Siegen Universität (Germany)

Conference Chairs

Chiharu Ishii, Hosei University (Japan)
Genci Capi, Hosei University (Japan)
Adrian Olaru, University Politehnica of Bucharest (Romania)

Local Chair

Genci Capi, Hosei University (Japan)

Program Chairs

Toyomi Fujita, Tohoku Institute of Technology (Japan)
Matsumoto Mitsuharu, University of Electro-Communications (Japan)
Vladimir Arlazarov, Russian Academy of Sciences (Russian Federation)

Publicity Chairs

Olga Dolinina, Yuri Gagarin State Technical University of Saratov
(Russian Federation)
Katarina Monkova, Catholic University in Ruzomberok (Slovakia)
Jianhong Zhou, Xihua University (China)

Technical Committee

Nikolay Berkovskii, St. Petersburg State Polytechnical University
(Russian Federation)
Boris Alpatov, Ryazan State Radio-Engineering University
(Russian Federation)
Evgeny Burnaev, Institute for Information Transmission Problems
(Russian Federation)
Vadim R. Gasiyarov, South Ural State University (Russian Federation) and
National Research University (Russian Federation)
Olga Dolinina, Yuri Gagarin State Technical University of Saratov
(Russian Federation)
Victor Savorskiy, FIRE RAS (Russian Federation)
V. V. Shurenkov, National Research Nuclear University MEPhI
(Russian Federation)

Pawel Wawrzynski, Warsaw University of Technology (Poland)
Ebrahim Mattar, University of Bahrain (Bahrain)
Halenar Igor, Slovak University of Technology in Bratislava (Slovakia)
George Boiadjiev, Sofia University (Bulgaria)
Thirugnanam Gurunathan, Annamalai University (India)
Muhammad M.A.S. Mahmoud, Transilvania University of Brasov (Romania)
Rajesh Singla, BR Ambedkar NIT Jalandhar (India)
Ali Elmelhi, University of Tripoli (Libya)
Benyamin Kusumoputro, University of Indonesia (Indonesia)
Ali Chaibakhsh, University of Guilan (Iran, Islamic Republic of)
Katarina Monkova, Catholic University in Ruzomberok (Slovakia)
S. Satyanarayana, Koneru Lakshmaiah Education Foundation (India)
Peng Chen, Southwest Jiaotong University (China)
Roman Fedorenko, Southern Federal University (Russian Federation)
Mikhail Medvedev, Southern Federal University (Russian Federation)
Kleddao Satcharoen, King Mongkut's Institute of Technology Ladkrabang
 (Thailand)
Chang-Hsing Lee, Chung Hua University (Taiwan)
S. Ramakrishnan, Indian Institute of Technology (India)
Kuo-Chin Fan, National Central University (Taiwan)
Azizbek Abduraimov, Al-Farabi Kazakh National University (Kazakhstan)

Introduction

The 2017 2nd International Conference on Robotics and Machine Vision (ICRMV) provided a forum for the most up-to-date and authoritative knowledge from both the industrial and academic worlds, sharing the newest research fruits and experiences in this exciting field. This inaugural ICRMV was held in Kitakyushu, Japan during 15–18 September 2017.

The scientific program for the event was filled with presentations delivered by researchers and scholars from the international community, including keynote speeches and highly selective lectures.

ICRMV received a total of 36 submitted papers this year. This volume contains 24 selected papers, which were presented at the conference. It provides up-to-date, comprehensive and worldwide state-of-the art knowledge in the field of robotics and machine vision. Every paper in this collection underwent rigorous peer-review performed by the conference technical committee and international reviewers before being selected for publication. Studies presented in this volume cover the following four specific topics: Object Detection and Pattern Recognition; Image Processing and Application; Modern Information Theory and Signal Processing; and Robot Design and Control Engineering.

We hope that the contents of this volume prove useful for researchers and practitioners working in the field of robotics and machine vision in their efforts to develop and apply new technologies and processes.

The organizing committee expresses sincere gratitude to all the authors who presented their works at ICRMV 2017 and contributed in this way to the success of this event. Special thanks are due to the authors from abroad for attending the conference and to the reviewers for their great support in improving the quality of the papers in this volume. The organizing committee also addresses warmest thanks to all the members of the international committee for their support and the many others for their contribution in organizing ICRMV 2017.

Chiharu Ishii
Genci Capi