

PROCEEDINGS OF SPIE

Ninth International Conference on Machine Vision (ICMV 2016)

**Antanas Verikas
Petia Radeva
Dmitry P. Nikolaev
Wei Zhang
Jianhong Zhou**
Editors

**18–20 November 2016
Nice, France**

Sponsored and Published by
SPIE

Volume 10341

Proceedings of SPIE 0277-786X, V. 10341

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

Ninth International Conference on Machine Vision (ICMV 2016), edited by Antanas Verikas, Petia Radeva,
Dmitry P. Nikolaev, Wei Zhang, Jianhong Zhou, Proc. of SPIE Vol. 10341, 1034101
© 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2276832

Proc. of SPIE Vol. 10341 1034101-1

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 *Ninth International Conference on Machine Vision (ICMV 2016)*, edited by Antanas Verikas, Petia Radeva, Dmitry P. Nikolaev, Wei Zhang, Jianhong Zhou, Proceedings of SPIE Vol. 10341 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510611313

ISBN: 9781510611320 (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**

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 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*
- xiii *Conference Committee*
- xv *Introduction*

SESSION 1 TARGET DETECTION

- 10341 02 **SOFF: Scalable and oriented FAST-based local features** [10341-6]
- 10341 03 **Automatic construction of a recurrent neural network based classifier for vehicle passage detection** [10341-72]
- 10341 04 **Moving object classification in infrared and visible spectra** [10341-12]
- 10341 05 **Human fall detection based on block matching and silhouette area** [10341-97]
- 10341 06 **Human motion detection and tracking** [10341-41]
- 10341 07 **Very deep recurrent convolutional neural network for object recognition** [10341-64]
- 10341 08 **Fast grasping of unknown objects using cylinder searching on a single point cloud** [10341-15]
- 10341 09 **Data-driven approach to human motion modeling with Lua and gesture description language** [10341-63]

SESSION 2 PATTERN RECOGNITION

- 10341 0A **Speaker gender identification based on majority vote classifiers** [10341-85]
- 10341 0B **Deep neural network features for horses identity recognition using multiview horses' face pattern** [10341-104]
- 10341 0C **Predicting human activities in sequences of actions in RGB-D videos** [10341-32]
- 10341 0D **Interacting with mobile devices by fusion eye and hand gestures recognition systems based on decision tree approach** [10341-100]
- 10341 0E **Towards human behavior recognition based on spatio temporal features and support vector machines** [10341-102]
- 10341 0F **Android application for handwriting segmentation using per TOHS theory** [10341-101]

- 10341 OG **Off-lexicon online Arabic handwriting recognition using neural network** [10341-62]
- 10341 OH **Real-time hand gesture recognition based on feature points extraction** [10341-39]
- 10341 OI **Methodology for mammal classification in camera trap images** [10341-82]
- 10341 OJ **Convolutional neural networks with balanced batches for facial expressions recognition** [10341-11]
- 10341 OK **Reading recognition of pointer meter based on pattern recognition and dynamic three-points on a line** [10341-18]
- 10341 OL **Recognizing online Arabic handwritten characters using a deep architecture** [10341-14]
- 10341 OM **CS-BoW: a scalable parallel image recognition method** [10341-10]
- 10341 ON **Initial proposition of kinematics model for selected karate actions analysis** [10341-3]
- 10341 OO **Trigram-based algorithms for OCR result correction** [10341-48]
- 10341 OP **Slant rectification in Russian passport OCR system using fast Hough transform** [10341-80]
- 10341 OQ **Fast integer approximations in convolutional neural networks using layer-by-layer training** [10341-78]

SESSION 3 VIDEO PROCESSING AND VISUALIZATION

- 10341 OR **Real-time mobile phone dialing system based on SSVEP** [10341-5]
- 10341 OS **Local visual similarity descriptor for describing local region** [10341-67]
- 10341 OT **Visual attention in egocentric field-of-view using RGB-D data** [10341-60]
- 10341 OU **Temporal and spatial information extraction from videos based on the change in length of the shadow** [10341-71]
- 10341 OV **Video denoising using low rank tensor decomposition** [10341-21]
- 10341 OW **Forward rectification: spatial image normalization for a video from a forward facing vehicle camera** [10341-55]
- 10341 OX **A study of vignetting correction methods in camera colorimetric calibration** [10341-37]
- 10341 OY **Snapscreen: TV-stream frame search with projectively distorted and noisy query** [10341-83]

SESSION 4 IMAGE TRANSFORMATION

- 10341 0Z **Comparative study of feature selection with ensemble learning using SOM variants** [10341-40]
- 10341 10 **Parameterized adaptive predictor for digital image compression based on the differential pulse code modulation** [10341-35]
- 10341 11 **A hybrid method of natural scene text detection using MSERs masks in HSV space color** [10341-98]
- 10341 12 **Semi-regular remeshing based trust region spherical geometry image for 3D deformed mesh used MLWNN** [10341-24]
- 10341 13 **Image deblurring in video stream based on two-level image model** [10341-86]
- 10341 14 **Automatic topics segmentation for TV news video** [10341-25]
- 10341 15 **Variational frame difference models for motion segmentation** [10341-26]
- 10341 16 **Unsupervised color texture segmentation using active contour model and oscillating information** [10341-38]
- 10341 17 **Random forest feature selection approach for image segmentation** [10341-68]
- 10341 18 **Comparison of k-means related clustering methods for nuclear medicine images segmentation** [10341-96]
- 10341 19 **Parallel implementation of a watershed algorithm on shared memory multicore architecture** [10341-33]

SESSION 5 IMAGE ANALYSIS

- 10341 1A **A new key recovery attack against DM-QIM image watermarking algorithm** [10341-45]
- 10341 1B **To image analysis in computed tomography** [10341-59]
- 10341 1C **Combining convolutional neural networks and Hough Transform for classification of images containing lines** [10341-76]
- 10341 1D **Fast techniques for nonlinear mapping of hyperspectral data** [10341-73]
- 10341 1E **The real time endoscopic image analysis** [10341-77]
- 10341 1F **Detection of informative fragments for image quality assessment** [10341-42]
- 10341 1G **New image quality metric used for the assessment of color quantization algorithms** [10341-36]
- 10341 1H **Further applications of the DSCSI metric for evaluating color quantization** [10341-43]

SESSION 6 ROBOT AND MACHINE VISION

- 10341 1I **Active classifier selection for RGB-D object categorization using a Markov random field ensemble method** [10341-46]
- 10341 1J **Robotic system construction with mechatronic components inverted pendulum: humanoid robot** [10341-8]
- 10341 1K **Comparative analysis of ROS-based monocular SLAM methods for indoor navigation** [10341-94]
- 10341 1L **Design of the arm-wrestling robot's force acquisition system based on Qt** [10341-16]
- 10341 1M **The research on visual industrial robot which adopts fuzzy PID control algorithm** [10341-47]
- 10341 1N **The calculation of a projective transformation in the problem of planar object targeting by feature points** [10341-53]
- 10341 1O **Machine vision and appearance based learning** [10341-79]
- 10341 1P **Iris recognition and what is next? Iris diagnosis - a new challenging topic for machine vision from image acquisition to image interpretation** [10341-105]
- 10341 1Q **The automated testing facility based on machine vision for optimizing grain quality control technology** [10341-54]
- 10341 1R **Real-time object-to-features vectorisation via Siamese neural networks** [10341-70]

SESSION 7 MEDICAL IMAGE PROCESSING

- 10341 1S **SVM classification of microaneurysms with imbalanced dataset based on borderline-SMOTE and data cleaning techniques** [10341-29]
- 10341 1T **On the analysis of local and global features for hyperemia grading** [10341-93]
- 10341 1U **Dense-HOG-based drift-reduced 3D face tracking for infant pain monitoring** [10341-30]
- 10341 1V **Hybrid approach for detection of dental caries based on the methods FCM and level sets** [10341-22]
- 10341 1W **Finding glenoid surface on scapula in 3D medical images for shoulder joint implant operation planning: 3D OCR** [10341-9]
- 10341 1X **Mammographic mass classification based on possibility theory** [10341-69]
- 10341 1Y **Abnormal cervical cell detection based on an adaptive margin-based feature selection method** [10341-7]

SESSION 8 IMAGE PROCESSING AND APPLICATIONS

- 10341 1Z **Towards diverse visual suggestions on Flickr** [10341-95]
- 10341 20 **High resolution satellite image indexing and retrieval using SURF features and bag of visual words** [10341-92]
- 10341 21 **Iris indexing based on local intensity order pattern** [10341-75]
- 10341 22 **A new indexing method of HDR images using color histograms** [10341-23]
- 10341 23 **A new method for text detection and recognition in indoor scene for assisting blind people** [10341-2]
- 10341 24 **Fast adaptive matting based on iterative solution** [10341-17]
- 10341 25 **Atmospheric correction of hyperspectral images using qualitative information about registered scene** [10341-27]
- 10341 26 **Classification of rice grain varieties arranged in scattered and heap fashion using image processing** [10341-91]
- 10341 27 **A framework of text detection and recognition from natural images for mobile device** [10341-51]
- 10341 28 **Classification of foods by transferring knowledge from ImageNet dataset** [10341-84]
- 10341 29 **A sparse representation-based approach for copy-move image forgery detection in smooth regions** [10341-87]
- 10341 2A **Aerial image geolocalization by matching its line structure with route map** [10341-56]

SESSION 9 COMPUTER INFORMATION TECHNOLOGY AND APPLICATIONS

- 10341 2B **Random forest ensemble classification based fuzzy logic** [10341-49]
- 10341 2C **Local polynomial model: a new approach to vignetting correction** [10341-50]
- 10341 2D **Spatial kernel bandwidth estimation in background modeling** [10341-28]
- 10341 2E **OpenCL-based vicinity computation for 3D multiresolution mesh compression** [10341-74]
- 10341 2F **Bayesian user modeling: evaluation metrics of an adaptive user interface** [10341-52]
- 10341 2G **Artificial intelligent e-learning architecture** [10341-34]
- 10341 2H **Force-directed visualization for conceptual data models** [10341-19]
- 10341 2I **Kernel credal classification rule** [10341-81]

- 10341 2J **Cluster forest based fuzzy logic for massive data clustering** [10341-31]
- 10341 2K **Comparison between extreme learning machine and wavelet neural networks in data classification** [10341-61]
- 10341 2L **Deep SOMs for automated feature extraction and classification from big data streaming** [10341-106]
- 10341 2M **Fuzzy feature selection based on interval type-2 fuzzy sets** [10341-90]

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.

Abdessamad, Jalila, 29
Abid, Mohamed, 2F
Afanasyev, Ilya, 1K
Aghdam, Hamed H., 28
Akil, Mohamed, 19
Akouaydi, Hanen, 0F
Alharbi, Mfawez, 2G
Ali, Haider, 1I
Alimi, Adel M., 0B, 0D, 0E, 0F, 0G, 11, 27, 2B, 2J, 2M
Amiri, Hamid, 23
Aralasmak, Ayse, 1W
Arlazarov, Vladimir, 0P, 0Q
Arlazarov, Vladimir, 0Y
Arous, Najet, 0Z
Asadchikov, Victor, 1B
Baklouti, Nesrine, 2M
Bal, Artur, 0X, 2C
Barreira, N., 1T
Battigaglia, Andrew, 2H
Battini Sönmez, Elena, 0J
Bedoui, Mohamed Hédi, 19
Bellil, Wajdi, 12
Ben Ali, Ramzi, 1V
Ben Amar, Chokri, 02, 07, 0A, 12, 1Z, 2E, 2K
Ben Ammar, Anis, 02, 1Z
Ben Aoun, Najib, 07
Ben Ayed, Abdelkarim, 2B, 2J
Ben Halima, Mohamed, 11, 27, 2B, 2J
Benesova, Wanda, 0T
Benhamouda, Marwa, 2B
Benzarti, Faouzi, 23
Bernstein, Alexander, 1O
Bezmaternykh, Pavel, 0P
Bhat, Sudhanva, 26
Bilsel, Kerem, 1W
Borys, Damian, 18
Boubaker, Houcine, 0G
Bouhleb, Mohamed Salim, 06, 0H
Bouhleb, Noura, 02
Boujnah, Noureddine, 06, 0H
Bousetta, Sana, 1X
Bouteldja, Samia, 20
Braham, Yosra, 19
Brahimi, Sourour, 07
Bulatov, Konstantin, 0O, 0Y
Burnaev, Evgeny, 03
Buyval, Alexander, 1K
Buzmakov, Alexey, 1B
Bykov, Dmitry, 1E
Bzowski, Pawel, 18
Cangelosi, Angelo, 0J
Cao, Jianting, 0R, 0V
Chaabene, Marwa, 14, 1V, 1V, 2L
Chaabouni, Aymen, 0G
Charfeddine, Maha, 0A
Chen, Feng, 1L
Cherif, Sahar, 2M
Chernov, Timofey, 0Y
Chukalina, Marina, 1B
Cichocki, Andrzej, 0V
Crainic, Marius Florin, 1J
Crisan, Septimiu, 21
Cui, Gaochao, 0R, 0V
Danch-Wierzchowska, Marta, 18
de With, Peter H. N., 1U
Denisova, Anna, 25
Dhibi, Naziha, 12
Dias, Miguel, 0C
Díaz Pulido, Angélica, 0I
Ding, Mingli, 0K
Dolga, Valer, 1J
Durner, Maximilian, 1I
Ejbal, Ridha, 05
El Bendadi, Khawla, 2I
ElAdel, Asma, 29
Elkefi, Akram, 12, 2E
Elleuch, Hanene, 0D
Emerich, Simina, 17, 21
Faradjev, Igor, 0O, 1N
Fedorenko, Fedor, 1R
Feki, Ghada, 1Z
Fendri, Emna, 04
Feng, Yifei, 1M
Fidali, Ameni, 0Z
Frackiewicz, Mariusz, 1G, 1H
Fu, Wuyifang, 0K
Gashnikov, M. V., 10, 1F
Ghabri, Sawsen, 0E
Gnouma, Mariem, 05
Gui, Lihua, 0V
Hachaj, Tomasz, 09, 0N
Hachani, Meha, 22
Hachicha, Soumaya, 2E
Hammami, Mohamed, 04
Hamrouni, Kamel, 1X
Heravi, Elnaz J., 28
Hillenbrand, Ulrich, 1I

Hmayda, Mounira, 14
Hmida, Marwa, 1X
Huang, Baoxiang, 16
Huang, Xianglin, 0S
Huo, Zhixiang, 1L
Ilin, Dmitry, 0Q
Ingacheva, Anastasia, 1B
Isaza Narváez, Claudia, 0I
Jabnoun, Hanen, 23
Janiszewski, Igor, 0O
Jaouedi, Neziha, 06, 0H
Jardim, David, 0C
Jarraya, Islem, 0B
Jemai, Olfa, 2K
Jemmalí, Mehdi, 2G
Jeon, In S., 2D
Jiang, Weifeng, 1M
Jlassi, Chiraz, 0Z
Kadushnikov, Radi, 1E
Kececi, Emin Faruk, 1W
Khanipov, Timur, 03, 2A
Kherallah, Monji, 0L
Khwildi, Raoua, 22
Kim, HoWon, 24
Kim, Jaehwan, 24
Kleinstauber, Martin, 1I
Kobayashi, Toshiki, 0R
Koptelov, Ivan, 03
Koptyra, Katarzyna, 09, 0N
Kordecki, Andrzej, 0X, 2C
Kourgli, Assia, 20
Krivtsov, Valeriy, 1C
Ksibi, Amel, 02
Kunina, I. A., 2A
Kuznetsova, E. G., 2A
Lahmar, Ines, 2J
Lakhdar, Yissam, 2I
Lefkovits, László, 17, 2I
Lefkovits, Szidónia, 17
Lei, Qujiang, 08
Li, Kuan, 1Y
Li, Yongqiang, 0K
Limonova, Elena, 0P, 0Q, 13, 1C
Liu, Bowen, 15
Liu, Yang, 0M
Lu, Guoping, 1M
Maalej, Mohamed Amin, 2F
Magid, Evgeni, 1K
Mahfoudhi, Adel, 2F
Malutan, Raul, 2I
Manzhikov, Temudzhin, 0O
Márton, Zoltán, 1I
Mezghani, Eya, 0A
Mitekin, Vitaly, 1A
Mizgulin, Vyacheslav, 1E
Mohammad Sadeghi, Majid, 1W
Moldovan, Cristian, 1J
Mosquera, A., 1T
Mukovozov, Arseniy, 13
Myasnikov, Evgeniy, 1D

Myasnikov, Vladislav, 1F, 25
N, Arunachalam, 26
Nicolas, Henri, 0A
Nikolaev, Dmitry P., 0P, 0Q, 0Y, 13, 1B, 1C, 2A
Njah, Sourour, 0F
Novikov, German, 03
Nunes, Luís, 0C
Ogiela, Marek R., 09, 0N
Olesova, Veronika, 0T
Ouarda, Wael, 0B, 0E
Oules Zaid, Azza, 22
Palus, Henryk, 0X, 1G, 1H, 2C
Pan, Zhenkuan, 15, 16
Panať, Sreedath, 26
Panchenko, A. V., 1Q
Pena-Verdeal, H., 1T
Perner, Petra, 1P
Polatsek, Patrik, 0T
Polevoy, Dmitri V., 0W
Postnikov, V. V., 0W, 1Q
Preiřl, Stefan, 1J
Prun, Viktor E., 0W
Psiuk-Maksymowicz, Krzysztof, 18
Puig, Domenec, 28
Pulido Castelblanco, Luis, 0I
Rebai Boukhriss, Rania, 04
Rebai, Rim, 2F
Reshetnyak, N. V., 1Q
Saeijs, Ronald W.J.J., 1U
Said, Salwa, 2K
Sakkari, Mohamed, 2L
Samet, Anis, 0D
Samohin, A. M., 1Q
Sánchez, L., 1T
Sánchez, N., 1T
Sandru, Lucian Alexandru, 1J
Savu, Diana, 1J
Sbai, El Hassan, 2I
Selmi, Zied, 27
Shemiakina, Julia, 1N
Sheshkus, Alexander, 1C
Skoryukina, Natalya, 0Y
Slavin, Oleg, 0O
Snasel, Vaclav, 2M
Solaiman, Basel, 1X
Studenok, Sergey, 1E
Sutter, Noah, 2H
Tagougui, Najjiba, 0L
Terekhin, A. P., 2A
Tjon A Ten, Walther E., 1U
Turki, Housseem, 1I
Usilin, Sergey, 1R
Vaida, Mircea Florin, 17
Wali, Ali, 0D, 27
Wan, Yongtao, 1L
Wang, Dongsheng, 0R, 0V
Wang, Guodong, 16
Wang, Jiayun, 0U
Wang, Likang, 0U
Wang, Qingjie, 1S

Wang, Shourun, 15
Watabe, Daishi, 0R
Wei, Weibo, 15
Wisse, Martijn, 08
Wu, Jiayi, 1S
Xin, Jingmin, 1S
Xu, Ye, 0S
Yahia, Hamdi, 0G
Yahia, Siwar, 2K
Yakimchuk, Ivan, 1B
Yang, Hongyun, 1Y
Yang, Lifang, 0S
Ye, Lulin, 1M
Yebra-Pimentel, E., 1T
Yin, Jianping, 1Y
Yoo, Suk I., 2D
Zaghbani, Soumaya, 06, 0H
Zaied, Mourad, 05, 14, 1V, 29, 2K, 2L
Zhang, Jinpeng, 16
Zhang, Ye, 1M
Zhang, Yongqiang, 0K
Zhao, Lili, 1Y
Zhao, Qibin, 0V
Zheng, Nanning, 1S
Zhukovsky, Alexander, 1N
Zu, Jian, 0U

Conference Committee

International Advisory Committee

Petra Perner, Institute of Computer Vision and Applied Computer Sciences (Germany)

Alexander Bernstein, Skolkovo Institute of Science and Technology (Russian Federation)

Conference Chairs

Antanas Verikas, Halmstad University (Sweden)

Petia Radeva, University of Barcelona (Spain)

Dmitry Nikolaev, Russian Academy of Sciences (Russian Federation)

Program Chairs

Aristidis Likas, University of Ioannina (Greece)

M-Tahar Kechadi, University College Dublin (Ireland) and University of Salerno (Italy)

Manuel F. González Penedo, Universidade da Coruña (Spain)

Enrique Nava, Universidade da Malaga (Spain)

Reyer Zwiggelaar, Aberystwyth University (United Kingdom)

Wei Zhang, Tongji University (China)

Publication Chair

Jianhong Zhou, University of Electronics Science and Technology of China (China)

Technical Committee

Mourad Zaied, Research Group on Intelligent Machines (Tunisia)

Ye Duan, University of Missouri (United States)

Sharifah Mumtazah bt Syed Ahmad Abdul Rahman, Universiti Putra Malaysia (Malaysia)

Kouahla Zineddine, LABSTIC-LINA (France)

Pino Caballero-Gil, Universidad de La Laguna (Spain)

Mircea-Florin Vaida, Sapientia Hungarian University of Transylvania (Romania)

Marek R. Ogiela, AGH University of Science and Technology (Poland)

Kamel Hamrouni, Ecole Nationale d'Ingénieurs de Tunis (Tunisia)

Angelo Cangelosi, University of Plymouth (United Kingdom)

Igor Faradjev, Federal Research Center "Computer Science and Control" of Russian Academy of Sciences (Russian Federation)

Oleg Slavin, Federal Research Center "Computer Science and Control" of Russian Academy of Sciences (Russian Federation)

Frédéric Morain-Nicolier, Université de Reims (France)
Mohamed Hammami, Miracl-FS (Tunisia)
Wang Jun, College of Electronics and Information Engineering,
Sichuan University (China)
Jing Zhang, Harbin Engineering University (China)
Luís Nunes, ISCTE - Instituto Universitário de Lisboa (Portugal)
Batouche Mohamed, Université Constantine 2 (Algeria)
Sbai El Hassan, Moulay Ismail University (Morocco)
Deng Huan, College of Electronics and Information Engineering,
Sichuan University (China)
Hamid Amiri, Signal, Images et Technologies de l'Information (Tunisia)
Chokri Ben Ammar, National Engineering School of Sfax (Tunisia)
M. Iqbal b. Saripan, Universiti Putra Malaysia (Malaysia)
Henri Nicolas, Laboratoire Bordelais de Recherche en Informatique,
University of Bordeaux (France)
Assia Kourgli, Faculté d'Electronique et d'Informatique, LTIR
(Algeria)
Xiao-Wei Li, College of Electronics and Information Engineering,
Sichuan University (China)
Qing Linbo, College of Electronics and Information Engineering,
Sichuan University (China)
Najet Arous, Enit (Tunisia)
Maya Dimitrova, Institute of Systems Engineering and Robotics
Bulgarian Academy of Sciences (Bulgaria)
Henryk Palus, Silesian University of Technology (Poland)
Evgeny Myasnikov, Samara National Research University (Russian
Federation)
Simon Karpenko, Institute for Information Transmission Problems of the
Russia Academy of Sciences (Russian Federation)
Aleksandar Markoski, St. Kliment Ohridski University – Bitola
(Macedonia)
Sei-ichiro Kamata, Waseda University (Japan)
Mohamed El-Sayed Farag, Al-Azhar University (Egypt)
Mehmet Cunkas, Selçuk University (Turkey)
Mohamed Rizon, Universiti Sultan Zainal Abidin (Malaysia)
Atsuo Yoshitaka, Japan Advanced Institute of Science and
Technology (Japan)
Francesco Ciompi, Radboud University (The Netherlands)
Jose M. Massa, UNICEN Universidad (Argentina)
Marcos Ortega, Universidade da Coruña (Spain)
Xose M. Pardo Lopez, Centro de Investigación en Tecnoloxías da
Información (Spain)
Qieshi Zhang, Waseda University (Japan)
Hareesha K. S., Manipal University (India)
Emna Fendri, Miracl-FS (Tunisia)
Seokwon Yeom, Daegu University (South Korea)

Introduction

Dear Distinguished Delegates and Guests,

The Organizing Committee warmly welcomes you to 2016 the 9th International Conference on Machine Vision (ICMV 2016), held during November 18-20, 2016, in Nice, France.

The ICMV 2016 aims to present the latest research and results of scientists (Professors, students, PhD Students, engineers, and post-doc scientists) related to Machine Vision. The conference provides opportunities for the different areas delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

The keynote speeches from leading experts in the field from all around the globe will present state-of-art in all major fields of Machine Vision. The highly selective peer-review progress will guarantee the quality of accepted papers that will be published by SPIE.

After the peer-review process, the submitted papers were selected on the basis of originality, significance, and clarity for the purpose of the conference. The selected papers and additional late-breaking contributions presented as lectures will make an exciting technical program.

The proceeding records the fully referred papers presented at the conference. The main conference theme and track is Machine Vision. We hope all participants and other interested readers benefit scientifically from the proceedings and it stimulating in the process.

On behalf of the conference committees, we're glad to have the pleasure to cordially invite you to this outstanding event, to share your latest research findings and/or R&D works with the research community by submitting papers to this conference.

Looking forward to seeing you in Nice, for ICMV 2016.

With our warmest regards,

**The Organizing Committees
November 18-20, 2016
Nice, France**

