Communications in Computer and Information Science

1180

Commenced Publication in 2007
Founding and Former Series Editors:
Phoebe Chen, Alfredo Cuzzocrea, Xiaoyong Du, Orhun Kara, Ting Liu,
Krishna M. Sivalingam, Dominik Ślęzak, Takashi Washio, Xiaokang Yang,
and Junsong Yuan

Editorial Board Members

Simone Diniz Junqueira Barbosa

Pontifical Catholic University of Rio de Janeiro (PUC-Rio), Rio de Janeiro, Brazil

Joaquim Filipe

Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh

Indian Statistical Institute, Kolkata, India

Igor Kotenko

St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, St. Petersburg, Russia

Lizhu Zhou

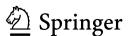
Tsinghua University, Beijing, China

More information about this series at http://www.springer.com/series/7899

Michael Cree · Fay Huang · Junsong Yuan · Wei Qi Yan (Eds.)

Pattern Recognition

ACPR 2019 Workshops Auckland, New Zealand, November 26, 2019 Proceedings



Editors
Michael Cree
University of Waikato
Hamilton, New Zealand

Junsong Yuan State University of New York at Buffalo Buffalo, NY, USA Fay Huang National Ilan University Yilan, Taiwan

Wei Qi Yan Auckland University of Technology Auckland, New Zealand

ISSN 1865-0929 ISSN 1865-0937 (electronic) Communications in Computer and Information Science ISBN 978-981-15-3650-2 ISBN 978-981-15-3651-9 (eBook) https://doi.org/10.1007/978-981-15-3651-9

© Springer Nature Singapore Pte Ltd. 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface

The 5th Asian Conference on Pattern Recognition (ACPR 2019), held in Auckland, New Zealand, during November 26–29, 2019, was accompanied by a series of five high-quality workshops covering the full range of state-of-the-art research topics in pattern recognition and related fields.

The workshops consisted of one full-day workshop and four half-day workshops and took place on November 26. Their topics diversely ranged from well-established areas to novel current trends: computer vision for modern vehicles; advances and applications on generative deep learning models (AAGM); image and pattern analysis for multidisciplinary computational anatomy; multi-sensor for action and gesture recognition (MAGR); and towards an automatic data processing chain for airborne and spaceborne sensors.

All submitted papers underwent a double-blind peer-review process, where each paper was reviewed by at least three area experts. Eventually, 23 oral presentations were selected by the individual Workshop Committee with the average acceptance rate of 50%. Additionally, 12 invited talks hosted by individual workshops greatly contributed to the success of the ACPR 2019 workshops. We thank everyone involved in the remarkable programs, committees, reviewers, and authors, for their distinguished contributions.

We hope that you will enjoy reading these contributions, which may inspire your research.

November 2019

Michael Cree Fay Huang Junsong Yuan

Organization

Steering Committee

Seong-Whan Lee Korea University, South Korea
Cheng-Lin Liu Chinese Academy of Sciences, China
Sankar K. Pal Indian Statistical Institute, India
Tieniu Tan Chinese Academy of Sciences, China

Yasushi Yagi Osaka University, Japan

General Chairs

Reinhard Klette Auckland University of Technology, New Zealand

Brendan McCane University of Otago, New Zealand Umapada Pal Indian Statistical Institute, India

Program Chairs

Networking, Italy

Shivakumara Palaiahnakote University of Malaya, Malaysia

Liang Wang Chinese Academy of Sciences, China

Publication Chair

Weiqi Yan Auckland University of Technology, New Zealand

International Liaison Chairs

Chokri Ben Amar University of Sfax, Tunisia - Africa

Wang Han Nanyang Technology University, Singapore - Asia

Edwin Hancock University of York, UK - Europe

Anil K. Jain University of Michigan, USA - North America

Domingo Mery Pontificia Univerisdad Catolica, Chile - Latin America

Workshop Chairs

Michael Cree University of Waikato, New Zealand Fay Huang National Ilan University, Taiwan

Junsong Yuan State University of New York at Buffalo, USA

Tutorial Chairs

Michael Blumenstein University of Technology Sydney, Australia

Yukiko Kenmochi French National Centre for Scientific Research, France

Ujjwal Maulik Jadavpur University, India

Sponsorship Chair

Koichi Kise Osaka University, Japan

Local Organizing Chair

Martin Stommel Auckland University of Technology, New Zealand

Organizing Committee

Terry Brydon Auckland University of Technology, New Zealand

Tapabrata Chakraborty University of Otago, New Zealand

Gisela Klette Auckland University of Technology, New Zealand Minh Nguyen Auckland University of Technology, New Zealand

Web Manager

Andrew Chen The University of Auckland, New Zealand

Chairs for the Workshop on Computer Vision for Modern Vehicles

Jinsheng Xiao Wuhan University, China Atsushi Imiya Chiba University, Japan

Hsiang-Jen Chien Auckland Transport, New Zealand

Thomas Braeunl The University of Western Australia, Australia

Chairs for the Workshop Advances and Applications on Generative Deep Learning Models

Mariano Rivera Center for Research in Mathematics AC, Mexico Wei Qi Yan Auckland University of Technology, New Zealand

Wangmeng Zuo Harbin Institute of Technology, China

Adrián Pastor Center for Research in Mathematics AC, Mexico

Lopez-Monroy

Chairs for the Workshop Image and Pattern Analysis for Multidisciplinary Computational Anatomy

Atsushi Imiya Chiba University, Japan

Harvey Ho The University of Auckland, New Zealand Yukiko Kenmochi Université Pairs-Est Marne-La-Vallée, France

Kensaku Mori Nagoya University, Japan

Hidekata Hontani Japan

Chairs for the Workshop Multi-Sensor for Action and Gesture Recognition

Jianyu Yang Soochow University, China Zhigang Tu Wuhan University, China

JingJing Meng State University of New York, USA

Chairs for the Workshop Towards an Automatic Data Processing Chain for Airborne and Spaceborne Sensors

Ralf Reulke Humboldt-Universität zu Berlin, Germany

Bin Luo Wuhan University, China

Contents

Computer Vision for Modern Vehicles	
Lane Detection Based on Histogram of Oriented Vanishing Points	3
Bypass Enhancement RGB Stream Model for Pedestrian Action Recognition of Autonomous Vehicles	12
Paved and Unpaved Road Segmentation Using Deep Neural Network Dabeen Lee, Seunghyun Kim, Hongjun Lee, Chung Choo Chung, and Whoi-Yul Kim	20
Image Scene Conversion Algorithm Based on Generative	
Adversarial Networks Honggang Xie, Jinsheng Xiao, Junfeng Lei, Wenjuan Xie, and Reinhard Klette	29
An Embedded Real-Time Monocular SLAM System Utilizing a Dynamically Reconfigurable Processor	37
Writer Identification Based on Combination of Bag of Words Model and Multiple Classifiers	47
Advances and Applications on Generative Deep Learning Models	
Vehicle-Related Scene Understanding Using Deep Learning	61
Spatiotemporal Saliency Based Multi-stream Networks	
for Action Recognition	74
Attention Guided Unsupervised Image-to-Image Translation	
with Progressively Growing Strategy	85

Human Motion Generation Based on GAN Toward Unsupervised 3D Human Pose Estimation	100
vi-MoCoGAN: A Variant of MoCoGAN for Video Generation of Human Hand Gestures Under Different Viewpoints	110
Image and Pattern Analysis for Multidisciplinary Computational Anatomy	
Weakly Supervised Domain Adaptation with Point Supervision in Histopathological Image Segmentation	127
Blood Vessel Enhancement in Liver Region from a Sequence of Angiograms Taken under Free Breathing	141
Real-Time Morphing of the Visible Man Liver with Intrahepatic Vasculatures	150
Development of 3D Physiological Simulation and Education Software for Pregnant Women	160
Resolution Conversion of Volumetric Array Data for Multimodal Medical Image Analysis	169
Multi-sensor for Action and Gesture Recognition	
Learning Spatiotemporal Representation Based on 3D Autoencoder for Anomaly Detection	187
Multi-view Discriminant Analysis for Dynamic Hand Gesture Recognition Huong-Giang Doan, Thanh-Hai Tran, Hai Vu, Thi-Lan Le, Van-Toi Nguyen, Sang Viet Dinh, Thi-Oanh Nguyen, Thi-Thuy Nguyen, and Duy-Cuong Nguyen	196
Human Action Recognition Based on Dual Correlation Network Fei Han, Dejun Zhang, Yiqi Wu, Zirui Qiu, Longyong Wu, and Weilun Huang	211

	Contents	xiii
Feature Engineering Workflow for Activity Recognition from Synchronized Inertial Measurement Units		223
Towards an Automatic Data Processing Chain for Airborne and Spaceborne Sensors		
Infrared-Image Processing for the DLR FireBIRD Mission Winfried Halle, Christian Fischer, Thomas Terzibaschian, Adi and Ralf Reulke		235
Temperature Dependence of Dark Signal for Sentinel-4 Detector. Ralf Reulke, Michael P. Skegg, and Rüdiger Hohn		253
An Extended Stochastic Cloning Method for Fusing Multi-relative Measurements Hongmou Zhang, Dirk Baumbach, Denis Grießbach, and Anke		263
Author Index		277