Lecture Notes in Computer Science

Commenced Publication in 1973 Founding and Former Series Editors: Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison Lancaster University, Lancaster, UK Takeo Kanade Carnegie Mellon University, Pittsburgh, PA, USA Josef Kittler University of Surrey, Guildford, UK Jon M. Kleinberg Cornell University, Ithaca, NY, USA Friedemann Mattern ETH Zurich, Zurich, Switzerland John C. Mitchell Stanford University, Stanford, CA, USA Moni Naor Weizmann Institute of Science, Rehovot, Israel C. Pandu Rangan Indian Institute of Technology Madras, Chennai, India Bernhard Steffen TU Dortmund University, Dortmund, Germany Demetri Terzopoulos University of California, Los Angeles, CA, USA Doug Tygar University of California, Berkeley, CA, USA

More information about this series at http://www.springer.com/series/7412

Xiang Bai · Yi Fang · Yangqing Jia · Meina Kan · Shiguang Shan · Chunhua Shen · Jingdong Wang · Gui-Song Xia · Shuicheng Yan · Zhaoxiang Zhang · Kamal Nasrollahi · Gang Hua · Thomas B. Moeslund · Qiang Ji (Eds.)

Video Analytics

Face and Facial Expression Recognition

Third International Workshop, FFER 2018 and Second International Workshop, DLPR 2018 Beijing, China, August 20, 2018 Revised Selected Papers



Editors Xiang Bai Huazhong University of Science and Technology Wuhan, China

Yangqing Jia Facebook (United States) San Francisco, CA, USA

Shiguang Shan Chinese Academy of Sciences Beijing, China

Jingdong Wang Microsoft Research Asia (China) Beijing, China

Shuicheng Yan National University of Singapore Singapore, Singapore

Kamal Nasrollahi Aalborg University Aalborg, Denmark

Thomas B. Moeslund Aalborg University Aalborg, Denmark Yi Fang New York University Abu Dhabi Abu Dhabi, UAE

Meina Kan Chinese Academy of Sciences Beijing, China

Chunhua Shen University of Adelaide Adeladie, SA, Australia

Gui-Song Xia Wuhan University Wuhan, China

Zhaoxiang Zhang Chinese Academy of Sciences Beijing, China

Gang Hua Microsoft Research Seattle, WA, USA

Qiang Ji Rensselaer Polytechnic Institute Troy, NY, USA

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-030-12176-1 ISBN 978-3-030-12177-8 (eBook) https://doi.org/10.1007/978-3-030-12177-8

Library of Congress Control Number: 2018968328

LNCS Sublibrary: SL6 - Image Processing, Computer Vision, Pattern Recognition, and Graphics

© Springer Nature Switzerland AG 2019

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, express 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 Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The DLPR workshop was formerly known as the International Workshop on Deep Learning for Pattern Recognition. This workshop was first held in conjunction with the 23rd International Conference on Pattern Recognition (ICPR 2016). The second workshop was held in conjunction with ICPR 2018, and was jointly organized with the Workshop on Face and Facial Expression Recognition from Real World Videos (FFER). The purpose of this workshop is to bring together researchers who are working on developing deep learning and pattern recognition to report or exchange their progress in deep learning for pattern recognition. The reviewing was single-blind, and about 20 external expert reviewers from the community were invited to help with specific papers. Each paper was reviewed by at least three reviewers. To come to a final consensus on the papers for the program and these proceedings, an online meeting was held where each paper was discussed. Finally, the committee selected seven papers from nine submissions, covering various topics in pattern recognition including histopathological images, action recognition, scene text detection, speech recognition, object classification, presentation attack detection, and driver drowsiness detection. All papers were presented as oral papers. Moreover, there were two invited keynotes and more than 40 researchers attended this workshop.

We would like to express our gratitude to all our colleagues for submitting papers to the DLPR and FFER workshops, and all the reviewers for their contribution.

January 2019

Xiang Bai Yi Fang Yangqing Jia Meina Kan Shiguang Shan Chunhua Shen Jingdong Wang Gui-Song Xia Shuicheng Yan Zhaoxiang Zhang Kamal Nasrollahi Gang Hua Thomas B. Moeslund Qiang Ji

Organization

DLPR Organizers

Xiang Bai	Huazhong University of Science and Technology, Wuhan, China
Yi Fang	New York University Abu Dhabi and New York
	University, Abu Dhabi, UAE
Yangqing Jia	Facebook, San Francisco, USA
Meina Kan	ICT, Chinese Academy of Sciences, Beijing, China
Shiguang Shan	ICT, Chinese Academy of Sciences, Beijing, China
Chunhua Shen	University of Adelaide, Australia
Jingdong Wang	Microsoft Research Asia, Beijing, China
Gui-Song Xia	Wuhan University, China
Shuicheng Yan	National University of Singapore, Singapore
Zhaoxiang Zhang	Institute of Automation, Chinese Academy of Sciences,
	Beijing, China

FFER Organizers

Kamal Nasrollahi	Aalborg University, Denmark
Gang Hua	Microsoft Research, Seattle, USA
Thomas B. Moeslund	Aalborg University, Denmark
Qiang Ji	Rensselaer Polytechnic Institute, USA

Reviewers

Albert Ali Salah	Bogazici University, Turkey
Anastasios Doulamis	Technical University of Crete, Greece
Andrea Lagorio	University of Sassari, Italy
François Brémond	Inria Sophia Antipolis, France
Gholamreza Anbarjafari	University of Tartu, Estonia
Gian Luca Foresti	University of Udine, Italy
Gonzàlez Jordi	Universitat Autònoma de Barcelona, Spain
Greg Mori	Simon Fraser University, Canada
Hans-Albert Löbel Díaz	Catholic University of Chile, Chile
Hedvig Kjellström	KTH Royal Institute of Technology, Sweden
Hugo Jair Escalante	INAOE, Mexico
Jeffrey Cohn	University of Pittsburgh, USA
Jianxin Wu	Nanjing University, China
Jose Alba-Castro	Vigo University, Spain
Lijun Yin	State University of New York at Binghamton, USA
Massimo Tistarelli	University of Sassari, Italy

Matthew Turk	University of California, Santa Barbara, USA
Nikolaos Doulamis	National Technical University of Athens, Greece
Paulo L. Correia	Universidade de Lisboa, Portugal
Rama Chellappa	University of Maryland, USA
Sergio Escalera	University of Barcelona, Spain
Shangfei Wang	University of Science and Technology of China, China
Stan Sclaroff	Boston University, USA
Sudeep Sarkar	University of South Florida, Tampa, USA
Víctor Ponce-López	University of Bristol, UK
Vladimir Pavlovic	Rutgers University, USA
Yan Tong	University of South Carolina, USA
Yunlian Sun	Chinese of Academy of Sciences, China

Contents

Convolutional Neural Network-Based Classification of Histopathological Images Affected by Data Imbalance	1
Three-Stream Convolution Networks After Background Subtraction for Action Recognition	12
Scene Text Detection with a SSD and Encoder-Decoder Network Based Method	25
Effective SVD-Based Deep Network Compression for Automatic Speech Recognition	35
Evaluation of Group Convolution in Lightweight Deep Networks for Object Classification	48
Image-Based Driver Drowsiness Detection	61
Continuous Presentation Attack Detection in Face Biometrics Based on Heart Rate Javier Hernandez-Ortega, Julian Fierrez, Ester Gonzalez-Sosa, and Aythami Morales	72
Author Index	87