

PROCEEDINGS OF SPIE

Applications of Digital Image Processing XLV

Andrew G. Tescher
Touradj Ebrahimi
Editors

22–24 August 2022
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 12226

Proceedings of SPIE 0277-786X, V. 12226

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

Applications of Digital Image Processing XLV, edited by Andrew G. Tescher,
Touradj Ebrahimi, Proc. of SPIE Vol. 12226, 1222601 · © 2022
SPIE · 0277-786X · doi: 10.1117/12.2661464

Proc. of SPIE Vol. 12226 1222601-1

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 *Applications of Digital Image Processing XLV*, edited by Andrew G. Tescher, Touradj Ebrahimi, Proc. of SPIE 12226, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510654365
ISBN: 9781510654372 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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 *Conference Committee*

COMPRESSION I

- 12226 02 **Joint backward and forward temporal masking for perceptually optimized x265-based video coding** [12226-1]
- 12226 03 **Spatial scalability with VVC: coding performance and complexity** [12226-3]
- 12226 04 **AV1 benchmarking test for 3GPP** [12226-4]
- 12226 05 **Towards effective visual information storage on DNA support** [12226-5]
- 12226 06 **Direct optimization of λ for HDR content adaptive transcoding in AV1** [12226-6]
- 12226 07 **Towards efficient multi-codec streaming** [12226-7]

COMPRESSION II

- 12226 08 **Improving reference picture resampling (RPR) for future video coding** [12226-8]
- 12226 09 **A study on flexible block partitioning for future video coding standards** [12226-9]
- 12226 0A **Green image codec: a lightweight learning-based image coding method** [12226-10]
- 12226 0C **Advanced video quality assessment of leading codecs: AV1, VVC, and their draft successor designs** [12226-13]

HUMAN VISUAL SYSTEM AND PERCEPTION

- 12226 0D **Towards JPEG AIC part 3: visual quality assessment of high to visually lossless image coding** [12226-14]
- 12226 0E **Detection of facial emotions using neuromorphic computation** [12226-15]
- 12226 0F **Optimal rendition resolution selection algorithm for web streaming players** [12226-16]

- 12226 OG **Bootstrapping HDR video quality analysis from SDR via data-adaptive grading** [12226-17]
- 12226 OH **Perceptually motivated deep neural network for video compression artifact removal** [12226-18]
- 12226 OI **Multiple image super-resolution from the BGU SWIR CubeSat satellite** [12226-19]

IMAGING SYSTEMS

- 12226 OJ **CLASSROOM: synthetic high dynamic range light field dataset** [12226-45]
- 12226 OK **Comparison study of adaptive RGB-D SLAM systems** [12226-21]
- 12226 OL **Noise removal of thermal images using deep learning approach** [12226-22]
- 12226 OM **On combining denoising with learning-based image decoding** [12226-24]
- 12226 ON **A novel assessment framework for learning-based deepfake detectors in realistic conditions** [12226-23]

NEW IMAGING STANDARDS

- 12226 OQ **Analysis of AV1 coding tools** [12226-28]
- 12226 OR **JPEG XS screen content coding extensions** [12226-29]
- 12226 OS **Enhancing SVT-AV1 with LCEVC to improve quality-cycles trade-offs and enhance sustainability of VOD transcoding** [12226-31]
- 12226 OT **Benchmarking and analysis of AV1 software decoding on Android devices** [12226-27]
- 12226 OU **Integrated learning-based point cloud compression for geometry and color with graph Fourier transforms** [12226-30]

IMAGING APPLICATIONS

- 12226 OV **H.264 or H.265 for lossy surveillance video transmission: a database study** [12226-32]
- 12226 OX **Range enhancement of a semi-flash lidar system using a sparse VCSEL array and depth upsampling** [12226-35]
- 12226 OY **Automating sports broadcasting using ultra-high definition cameras, neural networks, and classical denoising** [12226-36]

12226 0Z Convolutional neural networks for automatic detection of breast pathologies [12226-37]

12226 10 AI-based telepresence for broadcast applications [12226-34]

IMAGE AND VIDEO PROCESSING

12226 11 An algorithm for a quality-optimized bit rate ladder generation for video streaming services using a neural network [12226-38]

12226 12 FPGA synthesis of original chaotic system with application in imagen transmission [12226-39]

12226 13 An empirical approach for estimating the effect of a transcoding aware preprocessor [12226-40]

12226 14 Redundancy in lattice algebra based associative neural networks for image retrieval from noisy inputs [12226-41]

NEW IMAGING MODALITIES AND APPLICATIONS

12226 17 Quantitative performance evaluation in an augmented reality view enhancement driver assistant system [12226-44]

12226 18 Skin cancer post-operative scar evaluation using autofluorescence features [12226-46]

12226 19 Private key and password protection by steganographic image encryption [12226-49]

12226 1C Effective know-your-customer method for secure and trustworthy non-fungible tokens in media assets [12226-50]

POSTER SESSION

12226 1F Clustering in coarse registration task and extraction of common parts of point clouds [12226-55]

12226 1G ICP error functional using point cloud geometry [12226-56]

12226 1H Neural network for 3D point clouds alignment [12226-57]

12226 1I A comparative study of convolutional network models for the classification of abnormalities in mammograms [12226-58]

12226 1N Improving the speed of ImageJ filtering through threads [12226-53]

Conference Committee

Program Track Chair

Khan Iftekharuddin, Old Dominion University (United States)

Conference Chairs

Andrew G. Tescher, AGT Associates (United States)

Touradj Ebrahimi, Ecole Polytechnique Fédérale de Lausanne
(Switzerland)

Conference Program Committee

Vasudev Bhaskaran, Qualcomm Inc. (United States)

Antonin Descampe, intoPIX s.a. (Belgium)

Dan Grois, Comcast Corporation (United States)

Ofer Hadar, Ben-Gurion University of the Negev (Israel)

Ioannis Katsavounidis, Facebook Inc. (United States)

C.-C. Jay Kuo, The University of Southern California (United States)

Shan Liu, Tencent America, LLC (United States)

Andre J. Oosterlinck, KU Leuven Association (Belgium)

Fernando Pereira, Instituto de Telecomunicações (Portugal)

Yuriy A. Reznik, Brightcove, Inc. (United States)

Thomas Richter, Fraunhofer-Institut für Integrierte Schaltungen IIS
(Germany)

John A. Saghri, California Polytechnic State University, San Luis Obispo
(United States)

Peter Schelkens, Vrije University Brussel (Belgium)

Gary J. Sullivan, Microsoft Corporation (United States)

David S. Taubman, The University of New South Wales (Australia)

Pankaj Topiwala, FastVDO Inc. (United States)

