

IS&T International Symposium on Electronic Imaging Science and Technology 2020

**Image Processing: Algorithms and
Systems XVIII**

**Burlingame, California, USA
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Editors:

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IMAGE PROCESSING: ALGORITHMS AND SYSTEMS XVII

Monday, January 27, 2020

10:10 – 10:45 am Coffee Break

Image Processing with Machine Learning

Session Chairs: Sos Agaian, CSI City University of New York and The Graduate Center (CUNY) (United States); Karen Egiazarian, Tampere University (Finland); and Atanas Gotchev, Tampere University (Finland)

10:45 am – 12:30 pm

Harbour A/B

10:45

Conference Welcome

10:50

IPAS-025

Pruning neural networks via gradient information, Pavlo Molchanov, NVIDIA Corporation (United States)...N/A

11:10

IPAS-026

Real-world fence removal from a single-image via deep neural network, Takuro Matsui, Takuro Yamaguchi, and Masaaki Ikehara, Keio University (Japan)...1

11:30

IPAS-027

Adaptive context encoding module for semantic segmentation, Congcong Wang¹, Faouzi Alaya Cheikh¹, Azeddine Beghdadi², and Ole Jakob Elle^{3,4}; ¹Norwegian University of Science and Technology (Norway), ²Universite Paris 13 (France), ³Oslo University Hospital (Norway), and ⁴University of Oslo (Norway)...7

11:50

IPAS-028

CNN-based classification of degraded images, Kazuki Endo¹, Masayuki Tanaka^{1,2}, and Masatoshi Okutomi¹; ¹Tokyo Institute of Technology and ²National Institute of Advanced Industrial Science and Technology (Japan)...13

12:10

IPAS-029

A deep learning-based approach for defect detection and removing on archival photos, Roman Sizyakin¹, Viacheslav Voronin^{1,2}, Nikolay Gapon¹, Evgeny Semenishchev^{1,2}, and Alexander Zelenski²; ¹Don State Technical University and ²Moscow State University of Technology "STANKIN" (Russian Federation)...19

12:30 – 2:00 pm Lunch

PLENARY: Frontiers in Computational Imaging

Session Chairs: Radka Tezaur, Intel Corporation (United States), and Jonathan Phillips, Google Inc. (United States)

2:00 – 3:10 pm

Grand Peninsula Ballroom D

Imaging the Unseen: Taking the First Picture of a Black Hole, Katie Bouman, assistant professor, Computing and Mathematical Sciences Department, California Institute of Technology (United States)...N/A

Medical Image Processing

Session Chairs: Sos Agaian, CSI City University of New York and The Graduate Center (CUNY) (United States), and Atanas Gotchev, Tampere University (Finland)

3:30 – 4:30 pm

Harbour A/B

3:30

IPAS-062

An active contour model for medical image segmentation using a quaternion framework, Viacheslav Voronin^{1,2}, Evgeny Semenishchev^{1,2}, Alexander Zelenski², Marina Zhdanova², and Sos Agaian³; ¹Don State Technical University (Russian Federation), ²Moscow State University of Technology "STANKIN" (Russian Federation), and ³CSI City University of New York and The Graduate Center (CUNY) (United States)...25

3:50

IPAS-063

Improving 3D medical image compression efficiency using spatiotemporal coherence, Matina Zerva, Michalis Vrigkas, Lisimachos Kondi, and Christophoros Nikou, University of Ioannina (Greece)...30

4:10

IPAS-064

Pathology image-based lung cancer subtyping using deep-learning features and cell-density maps, Mustafa Jaber¹, Christopher Szeto², Bing Song², Liudmila Beziaeva³, Stephen Benz², and Shahrooz Rabizadeh²; ¹NantOmics, ²ImmunityBio, and ³NantHealth (United States)...35

5:00 – 6:00 pm All-Conference Welcome Reception

Tuesday, January 28, 2020

7:30 – 8:45 am Women in Electronic Imaging Breakfast;
pre-registration required

Scene Understanding

Session Chairs: Sos Agaian, CSI City University of New York and The Graduate Center (CUNY) (United States), and Karen Egiazarian, Tampere University (Finland)

8:50 – 10:10 am

Harbour A/B

8:50

IPAS-094

Two-step cascading algorithm for camera-based night fire detection, Minji Park, Donghyun Son, and ByoungChul Ko, Keimyung University (Republic of Korea)...39

9:10

IPAS-095

Introducing scene understanding to person re-identification using a spatio-temporal multi-camera model, Xin Liu, Herman Groot, Egor Bondarev, and Peter de With, Eindhoven University of Technology (the Netherlands)...43

9:30

IPAS-096

Use of retroreflective markers for object detection in harsh sensing conditions, Laura Goncalves Ribeiro, Olli Suominen, Sari Peltonen, and Atanas Gotchev, Tampere University (Finland)...N/A

9:50 IPAS-097

A novel image recognition approach using multiscale saliency model and GoogleNet, Guoan Yang, Xi'an Jiaotong University (China)...55

10:00 am – 7:30 pm Industry Exhibition - Tuesday

10:10 – 10:50 am Coffee Break

Image and Video Processing

Session Chairs: Sos Agaian, CSI City University of New York and The Graduate Center (CUNY) (United States); Karen Egiazarian, Tampere University (Finland); and Atanas Gotchev, Tampere University (Finland)

10:50 am – 12:30 pm

Harbour A/B

10:50 IPAS-133

Edge detection using the Bhattacharyya distance with adjustable block space, Jiho Yoon and Chulhee Lee, Yonsei University (Republic of Korea)...62

11:10 IPAS-134

Color interpolation algorithm for a periodic white-dominant RGBW color filter array, Kyeonghoon Jeong, Jonghyun Kim, and Moon Gi Kang, Yonsei University (Republic of Korea)...68

11:30 IPAS-135

Computational color constancy under multiple light sources, Jaeduk Han, Soonyoung Hong, and Moon Gi Kang, Yonsei University (Republic of Korea)...72

11:50 IPAS-136

Per clip Lagrangian multiplier optimisation for HEVC, Daniel Ringis, François Pitié, and Anil Kokaram, Trinity College (Ireland)...77

12:10 IPAS-137

An expandable image database for evaluation of full-reference image visual quality metrics, Mykola Ponomarenko¹, Oleg Ieremeiev², Vladimir Lukin², and Karen Egiazarian¹; ¹Tampere University (Finland) and ²National Aerospace University (Ukraine)...83

12:30 – 2:00 pm Lunch

PLENARY: Automotive Imaging

Session Chairs: Radka Tezaur, Intel Corporation (United States), and Jonathan Phillips, Google Inc. (United States)

2:00 – 3:10 pm

Grand Peninsula Ballroom D

Imaging in the Autonomous Vehicle Revolution, Gary Hicok, senior vice president, hardware development, NVIDIA Corporation (United States)...N/A

3:10 – 3:30 pm Coffee Break

Image Filtering and Enhancement

Session Chairs: Karen Egiazarian, Tampere University (Finland), and Atanas Gotchev, Tampere University (Finland)

3:30 – 5:30 pm

Harbour A/B

3:30 IPAS-177

Fractional contrast stretching for image enhancement of aerial and satellite images (JIST-first), Thaweesak Trongtirakul¹, Werapon Chiracharit¹, and Sos Agaian²; ¹King Mongkut's University of Technology Thonburi (Thailand) and ²CSI City University of New York and The Graduate Center (CUNY) (United States)...88

3:50 IPAS-178

Image debanding using iterative adaptive sparse filtering, Neeraj Gadgil, Qing Song, and Guan-Ming Su, Dolby Laboratories (United States)...99

4:10 IPAS-179

Hyperspectral complex-domain image denoising: Cube complex-domain BM3D (CCDBM3D) algorithm, Vladimir Katkovnik, Mykola Ponomarenko, Karen Egiazarian, Igor Shevkunov, and Peter Kocsis, Tampere University (Finland)...105

4:30 IPAS-180

Color restoration of multispectral images: Near-infrared (NIR) filter-to-color (RGB) image, Thaweesak Trongtirakul¹, Werapon Chiracharit¹, and Sos Agaian²; ¹King Mongkut's University of Technology Thonburi (Thailand) and ²CSI City University of New York and The Graduate Center (CUNY) (United States)...111

4:50 IPAS-181

Non-blind image deconvolution based on "ringing" removal using convolutional neural network, Takahiro Kudo, Takanori Fujisawa, and Masaaki Ikehara, Keio University (Japan)...116

5:10 IPAS-182

OEC-CNN: A simple method for over-exposure correction in photographs, Zhao Gao¹, Eran Edirisinghe¹, and Viacheslav Chesnokov²; ¹Loughborough University and ²ARM Limited (United Kingdom)...122

5:30 – 7:30 pm Symposium Demonstration Session

Wednesday, January 29, 2020

10:00 am – 3:30 pm Industry Exhibition - Wednesday

10:10 – 11:00 am Coffee Break

12:30 – 2:00 pm Lunch

PLENARY: VR/AR Future Technology

Session Chairs: Radka Tezaur, Intel Corporation (United States), and Jonathan Phillips, Google Inc. (United States)

2:00 – 3:10 pm

Grand Peninsula Ballroom D

Quality Screen Time: Leveraging Computational Displays for Spatial Computing, Douglas Lanman, director, Display Systems Research, Facebook Reality Labs (United States)...N/A

3:10 – 3:30 pm Coffee Break

Image Processing: Algorithms and Systems XVIII Interactive Papers Session

5:30 – 7:00 pm

Sequoia

The following works will be presented at the EI 2020 Symposium Interactive Papers Session.

IPAS-310

CNN performance dependence on linear image processing, Khalid Omer, Luca Caucci, and Meredith Kupinski, The University of Arizona (United States)...129

WITHDRAWN IPAS-311

Elastic graph-based semi-supervised embedding with adaptive loss regression, Fadi Dornaika and Youssef El Traboulsi, University of the Basque Country (Spain)...N/A

IPAS-312

Generative adversarial networks: A short review, Habib Ullah¹, Sultan Daud Khan¹, Mohib Ullah², and Faouzi Alaya Cheikh²; ¹University of Ha'il (Saudi Arabia) and ²Norwegian University of Science and Technology (Norway)...135

IPAS-313

Multiscale convolutional descriptor aggregation for visual place recognition, Raffaele Imbriaco, Egor Bondarev, and Peter de With, Eindhoven University of Technology (the Netherlands)...141

5:30 – 7:00 pm EI 2020 Symposium Interactive Posters Session

5:30 – 7:00 pm Meet the Future:

A Showcase of Student and Young Professionals Research