PROCEEDINGS

IS&T International Symposium on

Electronic Imaging

SCIENCE AND TECHNOLOGY

26 January 2020 — 30 January 2020 • Burlingame, CA, USA

Imaging and Multimedia Analytics in a Web and Mobile World 2020

Editors: **Jan P. Allebach**, Purdue Univ. (United States),
Zhigang Fan, Apple Inc. (United States), and
Qian Lin, HP Labs, HP Inc. (United States)

These papers represent the program of Electronic Imaging 2020,
held 26 January — 30 January 2020, at the Hyatt Regency San Francisco Airport in Burlingame, CA.

Imaging and Multimedia Analytics in a Web and Mobile World 2020

Conference overview

The recent progress in web, social networks, and mobile capture and presentation technologies has created a new wave of interest in imaging and multimedia topics, from multimedia analytics to content creation and repurposing, from engineering challenges to aesthetics and legal issues, from content sharing on social networks to content access from Smart Phones with cloud-based content repositories and services. Compared to many subjects in traditional imaging, these topics are more multi-disciplinary in nature. This conference provides a forum for researchers and engineers from various related areas, both academic and industrial to exchange ideas and share research results in this rapidly evolving field.

Award

Best Paper Award

Conference Chairs: Jan P. Allebach, Purdue University (United States); Zhigang Fan, Apple Inc. (United States); and Qian Lin, HP Inc. (United States)

Program Committee: Vijayan Asari, University of Dayton (United States); Raja Bala, PARC (United States); Reiner Fageth, CEWE Stiftung & Co. KGaA (Germany); Michael Gormish, Ricoh Innovations, Inc. (United States); Yandong Guo, XMotors (United States); Ramakrishna Kakarala, Picartio Inc. (United States); Yang Lei, HP Labs (United States); Xiaofan Lin, A9.COM, Inc. (United States); Changsong Liu, Tsinghua University (China); Yucheng Liu, Facebook Inc. (United States); Binu Nair, United Technologies Research Center (United States); Mu Qiao, Shutterfly, Inc. (United States); Alastair Reed, Digimarc Corporation (United States); Andreas Savakis, Rochester Institute of Technology (United States); Bin Shen, Google Inc. (United States); Wiley Wang, June Life, Inc. (United States); Jane You, The Hong Kong Polytechnic University (Hong Kong); and Tianli Yu, Morpx Inc. (China)

Conference Sponsors

Paper authors listed as of 1 January 2020;
refer to manuscript for final authors.
Titles that are not listed with the proceedings
files were presentation-only.

IMAGING AND MULTIMEDIA ANALYTICS IN A WEB AND MOBILE WORLD 2020

Tuesday, January 28, 2020

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

Drone Imaging I — JOINT SESSION

Session Chairs: Andreas Savakis, Rochester Institute of Technology (United States) and Grigorios Tsagkatakis, Foundation for Research and Technology (FORTH) (Greece)

8:45 – 10:10 am
Cypress B

This session is jointly sponsored by: Food and Agricultural Imaging Systems 2020, and Imaging and Multimedia Analytics in a Web and Mobile World 2020.

8:45
Conference Welcome

8:50 (Proceedings-only) IMAWM-084
A new training model for object detection in aerial images, *Geng Yang[1], Yu Geng[2], Qin Li[1], Jane You[3], and Mingpeng Cai[1]; [1]Shenzhen Institute of Information Technology (China), [2]Shenzhen Shangda Xinzhi Information Technology Co., Ltd. (China), and [3]The Hong Kong Polytechnic University (Hong Kong)*

9:10 IMAWM-085
Small object bird detection in infrared drone videos using mask R-CNN deep learning, *Yasmin Kassim[1], Michael Byrne[1], Cristy Burch[2], Kevin Mote[2], Jason Hardin[2], and Kannappan Palaniappan[1]; [1]University of Missouri and [2]Texas Parks and Wildlife (United States)*

9:30 IMAWM-086
High-quality multispectral image generation using conditional GANs, *Ayush Soni, Alexander Loui, Scott Brown, and Carl Salvaggio, Rochester Institute of Technology (United States)*

9:50 IMAWM-087
Deep Ram: Deep neural network architecture for oil/gas pipeline right-of-way automated monitoring, *Ruixu Liu, Theus Aspiras, and Vijayan Asari, University of Dayton (United States)*

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

10:10 – 10:30 am Coffee Break

Drone Imaging II — JOINT SESSION

Session Chairs: Vijayan Asari, University of Dayton (United States) and Grigorios Tsagkatakis, Foundation for Research and Technology (FORTH) (Greece)

10:30 – 10:50 am
Cypress B

This session is jointly sponsored by: Food and Agricultural Imaging Systems 2020, and Imaging and Multimedia Analytics in a Web and Mobile World 2020.

IMAWM-114
LambdaNet: A fully convolutional architecture for directional change detection, *Bryan Blakeslee and Andreas Savakis, Rochester Institute of Technology (United States)*

KEYNOTE: Remote Sensing in Agriculture I — JOINT SESSION

Session Chairs: Vijayan Asari, University of Dayton (United States) and Mohammed Yousefhussien, General Electric Global Research (United States)

10:50 – 11:40 am
Cypress B

This session is jointly sponsored by: Food and Agricultural Imaging Systems 2020, and Imaging and Multimedia Analytics in a Web and Mobile World 2020.

FAIS-127
Managing crops across spatial and temporal scales - The roles of UAS and satellite remote sensing, *Jan van Aardt, professor, Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology (United States)*

Biographies and/or abstracts for all keynotes are found on pages 9–14

KEYNOTE: Remote Sensing in Agriculture II — JOINT SESSION

Session Chairs: Vijayan Asari, University of Dayton (United States) and Mohammed Yousefhussien, General Electric Global Research (United States)

11:40 am – 12:30 pm
Cypress B

This session is jointly sponsored by: Food and Agricultural Imaging Systems 2020, and Imaging and Multimedia Analytics in a Web and Mobile World 2020.

FAIS-151
Practical applications and trends for UAV remote sensing in agriculture, *Kevin Lang, general manager of agriculture, PrecisionHawk (United States)*

Biographies and/or abstracts for all keynotes are found on pages 9–14

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)*

For abstract and speaker biography, see page 7

3:10 – 3:30 pm Coffee Break

Deep Learning: Multi-Media Analysis

Session Chair: Zhigang Fan, Apple Inc. (United States)

3:30 – 5:40 pm
Cypress B

3:30   IMAWM-183
Actual usage of AI to generate more interesting printed products (Invited), *Birte Stadtlander, Sven Wiegand, and Reiner Fageth, CEWE Stiftung & Co. KGAA (Germany)*

4:00   IMAWM-184
Deep learning for printed mottle defect grading, *Jianhang Chen[1], Qian Lin[2], and Jan Allebach[1]; [1]Purdue University and [2]HP Labs, HP Inc. (United States)*

4:20   IMAWM-185
A local-global aggregate network for facial landmark localization, *Ruiyi Mao[1,2], Qian Lin[3], and Jan Allebach[1]; [1]Purdue University, [2]Apple Inc., and [3]HP Labs, HP Inc. (United States)*

4:40   IMAWM-186
The blessing and the curse of the noise behind facial landmark annotations, *Xiaoyu Xiang[1], Yang Cheng[1], Shaoyuan Xu[1], Qian Lin[2], and Jan Allebach[1]; [1]Purdue University and [2]HP Labs, HP Inc. (United States)*

5:00   IMAWM-187
Gun source and muzzle head detection, *Zhong Zhou, Isak Czeresnia Etinger, Florian Metze, Alexander Hauptmann, and Alex Waibel, Carnegie Mellon University (United States)*

5:20   IMAWM-188
Semi-supervised multi-task network for image aesthetic assessment, *Xiaoyu Xiang[1], Yang Cheng[1], Jianhang Chen[1], Qian Lin[2], and Jan Allebach[1]; [1]Purdue University and [2]HP Labs, HP Inc. (United States)*

5:30 – 7:30 pm Symposium Demonstration Session

Wednesday, January 29, 2020

KEYNOTE: Personal Health Data and Surveillance

Session Chair: Jan Allebach, Purdue University (United States)

9:10 – 10:10 am
Cypress B

IMAWM-211

Health surveillance, *Ramesh Jain, Bren Professor in Information & Computer Sciences, Donald Bren School of Information and Computer Sciences, University of California, Irvine (United States)*

Biographies and/or abstracts for all keynotes are found on pages 9–14

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

10:10 – 10:30 am Coffee Break

Augmented Reality in Built Environments   JOINT SESSION

Session Chairs: Raja Bala, PARC (United States) and Matthew Shreve, Palo Alto Research Center (United States)

10:30 am – 12:40 pm
Cypress B

This session is jointly sponsored by: The Engineering Reality of Virtual Reality 2020, and Imaging and Multimedia Analytics in a Web and Mobile World 2020.

10:30   IMAWM-220
Augmented reality assistants for enterprise, *Matthew Shreve and Shiwali Mohan, Palo Alto Research Center (United States)*

11:00   IMAWM-221
Extra FAT: A photorealistic dataset for 6D object pose estimation, *Jianhang Chen[1], Daniel Mas Montserrat[1], Qian Lin[2], Edward Delp[1], and Jan Allebach[1]; [1]Purdue University and [2]HP Labs, HP Inc. (United States)*

11:20   WITHDRAWN IMAWM-222
Space and media: Augmented reality in urban environments, *Luisa Caldas, University of California, Berkeley (United States)*

12:00   ERVR-223
Active shooter response training environment for a building evacuation in a collaborative virtual environment, *Sharad Sharma and Sri Teja Bodempudi, Bowie State University (United States)*

12:20   ERVR-224
Identifying anomalous behavior in a building using HoloLens for emergency response, *Sharad Sharma and Sri Teja Bodempudi, Bowie State University (United States)*

12:40 – 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)*

For abstract and speaker biography, see page 7

3:10 – 3:30 pm Coffee Break

Deep Learning: Applications

Session Chair: Reiner Fageth, CEWE Stiftung & Co. KGAA (Germany)

3:30 – 4:30 pm
Cypress B

3:30   IMAWM-269
Identification of utility images with a mobile device, *Karthick Shankar[1], Qian Lin[2], and Jan Allebach[1]; [1]Purdue University and [2]HP Labs, HP Inc. (United States)*

3:50   IMAWM-270
PSO and genetic modeling of deep features for road passibility analysis during floods, *Naina Said[1], Aysha Nayab[1], Kashif Ahmad[2], Mohib Ullah[3], Touqir Gohar[1], and Ala Al-fuqaha[2]; [1]University of Engineering and Technology, Peshawar (Pakistan), [2]Hamad Bin Khallifa University (Qatar), and [3]Norwegian University of Science and Technology (Norway)*

4:10   WITHDRAWN   IMAWM-271
A deep neural network-based indoor positioning algorithm by cascade of image and WiFi, *Jichao Jiao[1], Xing Wang[2], Yaxin Zhao[1], Xinping Chen[1], Meng Guan[1], and Wei Cui[1]; [1]Beijing University of Posts and Telecommunications and [2]XMotors (China)*

Food and Computer Vision

Session Chair: Qian Lin, HP Labs, HP Inc. (United States)

4:30 – 5:30 pm
Cypress B

4:30   IMAWM-300
Shazam for food: Learning diet with visual data (Invited), *Fengqing Zhu, Sri Kalyan Yarlagadda, Runyu Mao, Zeman Shao, and Jiangpeng He, Purdue University (United States)*

4:50   IMAWM-301
Visual processing of dietary data: A nutrition science perspective, *Heather Eicher-Miller, Marah Aqeel, and Luotao Lin, Purdue University (United States)*

5:10   IMAWM-302
Image analytics for food safety, *Min Zhao, Susana Diaz-Amaya, Amanda J. Deering, Lia Stanciu, George Chiu, and Jan Allebach, Purdue University (United States)*

Imaging and Multimedia Analytics in a Web and Mobile World 2020 Interactive Papers Session

5:30 – 7:00 pm
Sequoia
The following work will be presented at the EI 2020 Symposium Interactive Papers Session.

IMAWM-309
Real-time whiteboard coding on mobile devices, *Xunyu Pan, Frostburg State University (United States)*

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