

IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

A publication of the IEEE Computer Society

APRIL 2021

VOLUME 43

NUMBER 4

ITPIDJ

(ISSN 0162-8828)

REGULAR PAPERS

<i>State of the Journal Editorial</i>	
S. Dickinson	1119
<i>Adversarial Margin Maximization Networks</i>	
Z. Yan, Y. Guo, and C. Zhang	1129
<i>Affine Invariants of Vector Fields</i>	
J. Kostková, T. Suk, and J. Flusser	1140
<i>Appearance and Pose-Conditioned Human Image Generation Using Deformable GANs</i>	
A. Siarohin, S. Lathuilière, E. Sangineto, and N. Sebe	1156
<i>Assessing Transferability From Simulation to Reality for Reinforcement Learning</i>	
F. Muratore, M. Gienger, and J. Peters	1172
<i>Bayesian Joint Matrix Decomposition for Data Integration with Heterogeneous Noise</i>	
C. Zhang and S. Zhang	1184
<i>Bilinear Image Translation for Temporal Analysis of Photo Collections</i>	
T. Dalens, M. Aubry, and J. Sivic	1197
<i>Corner Detection Using Second-Order Generalized Gaussian Directional Derivative Representations</i>	
W. Zhang and C. Sun	1213
<i>Deep Depth from Uncalibrated Small Motion Clip</i>	
S. Im, H. Ha, H.-G. Jeon, S. Lin, and I.S. Kweon	1225
<i>Effects of Image Degradation and Degradation Removal to CNN-Based Image Classification</i>	
Y. Pei, Y. Huang, Q. Zou, X. Zhang, and S.W.	1239
<i>Exploring Explicit Domain Supervision for Latent Space Disentanglement in Unpaired Image-to-Image Translation</i>	
J. Lin, Z. Chen, Y. Xia, S. Liu, T. Qin, and J. Luo	1254
<i>Forecasting People Trajectories and Head Poses by Jointly Reasoning on Tracklets and Vislets</i>	
I. Hasan, F. Setti, T. Tsesmelis, V. Belagiannis, S. Amin, A.D. Bue, M. Cristani, and F. Galasso	1267
<i>Ideals of the Multiview Variety</i>	
S. Agarwal, A. Pryhuber, and R.R. Thomas	1279
<i>InLoc: Indoor Visual Localization with Dense Matching and View Synthesis</i>	
H. Taira, M. Okutomi, T. Sattler, M. Cimpoi, M. Pollefeys, J. Sivic, T. Pajdla, and A. Torii	1293

(Contents continued on back cover)

Published in cooperation with: **Aerospace & Electronic Systems Society, Control Systems Society, Engineering in Medicine & Biology Society, Information Theory Society, Systems, Man & Cybernetics Society, Ultrasonics, Ferroelectrics, & Frequency Control Society**

Indexed in MEDLINE®/PubMed®
and indexed in ISI



www.computer.org
tpami@computer.org

<i>Interpreting the Rhetoric of Visual Advertisements</i> K. Ye, N.H. Nazari, J. Hahn, Z. Hussain, M. Zhang, and A. Kovashka	1308
<i>Joint Embedding of Graphs</i> S. Wang, J. Arroyo, J.T. Vogelstein, and C.E. Priebe	1324
<i>Large Scale Shadow Annotation and Detection Using Lazy Annotation and Stacked CNNs</i> L. Hou, T.F.Y. Vicente, M. Hoai, and D. Samaras	1337
<i>Orthogonal Deep Neural Networks</i> S. Li, K. Jia, Y. Wen, T. Liu, and D. Tao	1352
<i>Semi-Supervised Semantic Segmentation With High- and Low-Level Consistency</i> S. Mittal, M. Tatarchenko, and T. Brox	1369
<i>Sinusoidal Sampling Enhanced Compressive Camera for High Speed Imaging</i> C. Deng, Y. Zhang, Y. Mao, J. Fan, J. Suo, Z. Zhang, and Q. Dai	1380
<i>SpaRTA Tracking Across Occlusions via Partitioning of 3D Clouds of Points</i> A. Cavagna, S. Melillo, L. Parisi, and F. Ricci-Tersenghi	1394
<i>Visual Semantic Information Pursuit: A Survey</i> D. Liu, M. Bober, and J. Kittler	1404
<i>Weakly-Supervised Learning of Category-Specific 3D Object Shapes</i> J. Han, Y. Yang, D. Zhang, D. Huang, D. Xu, and F. De La Torre	1423
SHORT PAPERS	
<i>A Sparse Sampling-Based Framework for Semantic Fast-Forward of First-Person Videos</i> M. Silva, W. Ramos, M. Campos, and E.R. Nascimento	1438
<i>Deep Multi-View Enhancement Hashing for Image Retrieval</i> C. Yan, B. Gong, Y. Wei, and Y. Gao	1445
<i>Gliding Vertex on the Horizontal Bounding Box for Multi-Oriented Object Detection</i> Y. Xu, M. Fu, Q. Wang, Y. Wang, K. Chen, G.-S. Xia, and X. Bai	1452
<i>Ordered or Orderless: A Revisit for Video Based Person Re-Identification</i> L. Zhang, Z. Shi, J.T. Zhou, M.-M. Cheng, Y. Liu, J.-W. Bian, Z. Zeng, and C. Shen	1460



PURPOSE: The IEEE Computer Society is the world's largest association of computing professionals and is the leading provider of technical information in the field.

MEMBERSHIP: Members receive the monthly magazine *Computer*, discounts, and opportunities to serve (all activities are led by volunteer members). Membership is open to all IEEE members, affiliate society members, and others interested in the computer field. **OMBUDSMAN:** Email ombudsman@computer.org
COMPUTER SOCIETY WEBSITE: www.computer.org

EXECUTIVE COMMITTEE

President: Forrest Shull; **President-Elect:** William D. Gropp; **Past President:** Leila De Floriani; **First VP:** Riccardo Mariani; **Second VP:** Fabrizio Lombardi; **Secretary:** Ramalatha Marimuthu; **Treasurer:** David Lomet; **VP, Membership & Geographic Activities:** Andre Oboler; **VP, Professional & Educational Activities:** Hironori Washizaki; **VP, Publications:** M. Brian Blake; **VP, Standards Activities:** Riccardo Mariani; **VP, Technical & Conference Activities:** Grace Lewis; **2021-2022 IEEE Division VIII Director:** Christina M. Schober; **2020-2021 IEEE Division V Director:** Thomas M. Conte; **2021 IEEE Division V Director-Elect:** Cecilia Metra

BOARD OF GOVERNORS

Term Expiring 2021: M. Brian Blake, Fred Douglass, Carlos E. Jimenez-Gomez, Ramalatha Marimuthu, Erik Jan Marinissen, Kunio Uchiyama
Term Expiring 2022: Nils Aschenbruck, Ernesto Cuadros-Vargas, David S. Ebert, Grace Lewis, Hironori Washizaki, Stefano Zanero
Term Expiring 2023: Jyotika Athavale, Terry Benzel, Takako Hashimoto, Irene Pazos Viana, Annette Reilly, Deborah Silver

BOARD OF GOVERNORS MEETING

1 - 5 February 2021, virtual

EXECUTIVE STAFF

Executive Director: Melissa A. Russell; **Director, Governance & Associate Executive Director:** Anne Marie Kelly; **Director, Conference Operations:** Silvia Ceballos; **Director, Finance & Accounting:** Sunny Hwang; **Director, Information Technology & Services:** Sumit Kacker; **Director, Marketing & Sales:** Michelle Tubb; **Director, Membership & Education:** Eric Berkowitz

COMPUTER SOCIETY OFFICES

Washington, D.C.: 2001 L St., Ste. 700, Washington, D.C. 20036-4928; **Phone:** +1 202 371 0101; **Fax:** +1 202 728 9614; **Email:** help@computer.org

Los Alamitos: 10662 Los Vaqueros Cir., Los Alamitos, CA 90720; **Phone:** +1 714 821 8380; **Email:** help@computer.org

MEMBERSHIP & PUBLICATION ORDERS: **Phone:** +1 800 678 4333; **Fax:** +1 714 821 4641; **Email:** help@computer.org

IEEE BOARD OF DIRECTORS

President: Susan K. "Kathy" Land; **President-Elect:** K.J. Ray Liu; **Past President:** Toshio Fukuda; **Secretary:** Kathleen A. Kramer; **Treasurer:** Mary Ellen Randall; **Director & President, IEEE-USA:** Katherine J. Duncan; **Director & President, Standards Association:** James Matthews; **Director & VP, Educational Activities:** Stephen Phillips; **Director & VP, Membership and Geographic Activities:** Maïke Luiken; **Director & VP, Publication Services & Products:** Lawrence Hall; **Director & VP, Technical Activities:** Roger U. Fujii