

IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

A publication of the IEEE Computer Society

MARCH 2022

VOLUME 44

NUMBER 3

ITPIDJ

(ISSN 0162-8828)

REGULAR PAPERS

<i>A Mathematical Model for Universal Semantics</i> W. E and Y. Zhou	1124
<i>Active Surveillance via Group Sparse Bayesian Learning</i> H. Pei, B. Yang, J. Liu, and K.C.-C. Chang	1133
<i>Building and Interpreting Deep Similarity Models</i> O. Eberle, J. Büttner, F. Kräutli, K.-R. Müller, M. Valleriani, and G. Montavon	1149
<i>Deformable Generator Networks: Unsupervised Disentanglement of Appearance and Geometry</i> X. Xing, R. Gao, T. Han, S.-C. Zhu, and Y.N. Wu	1162
<i>DE-GAN: A Conditional Generative Adversarial Network for Document Enhancement</i> M.A. Souibgui and Y. Kessentini	1180
<i>Densely Residual Laplacian Super-Resolution</i> S. Anwar and N. Barnes	1192
<i>Differential Viewpoints for Ground Terrain Material Recognition</i> J. Xue, H. Zhang, K. Nishino, and K.J. Dana	1205
<i>Disentangling Monocular 3D Object Detection: From Single to Multi-Class Recognition</i> A. Simonelli, S.R. Bulò, L. Porzi, M.L. Antequera, and P. Kotschieder	1219
<i>Efficient and Stable Graph Scattering Transforms via Pruning</i> V.N. Ioannidis, S. Chen, and G.B. Giannakis.....	1232
<i>End-to-End Optimized Versatile Image Compression With Wavelet-Like Transform</i> H. Ma, D. Liu, N. Yan, H. Li, and F. Wu.....	1247
<i>Fuzzy-Match Repair Guided by Quality Estimation</i> J.E. Ortega, M.L. Forcada, and F. Sánchez-Martínez.....	1264
<i>Generative Imputation and Stochastic Prediction</i> M. Kachuee, K. Karkkainen, O. Goldstein, S. Darabi, and M. Sarrafzadeh	1278
<i>GMFAD: Towards Generalized Visual Recognition via Multilayer Feature Alignment and Disentanglement</i> H. Li, S. Wang, R. Wan, and A.C. Kot.....	1289

(Contents continued on page 1123)

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>Grid Anchor Based Image Cropping: A New Benchmark and An Efficient Model</i> H. Zeng, L. Li, Z. Cao, and L. Zhang.....	1304
<i>Incomplete Label Multiple Instance Multiple Label Learning</i> T. Nguyen and R. Raich	1320
<i>Incremental Density-Based Clustering on Multicore Processors</i> S.T. Mai, J. Jacobsen, S. Amer-Yahia, I. Spence, N.-P. Tran, I. Assent, and Q.V.H. Nguyen	1338
<i>Kernel-Based Density Map Generation for Dense Object Counting</i> J. Wan, Q. Wang, and A.B. Chan	1357
<i>Knowledge-Guided Multi-Label Few-Shot Learning for General Image Recognition</i> T. Chen, L. Lin, R. Chen, X. Hui, and H. Wu	1371
<i>Large-Scale Nonlinear AUC Maximization via Triply Stochastic Gradients</i> Z. Dang, X. Li, B. Gu, C. Deng, and H. Huang	1385
<i>Learning Semantic Correspondence Exploiting an Object-Level Prior</i> J. Lee, D. Kim, W. Lee, J. Ponce, and B. Ham.....	1399
<i>Leveraging Instance-, Image- and Dataset-Level Information for Weakly Supervised Instance Segmentation</i> Y. Liu, Y.-H. Wu, P. Wen, Y. Shi, Y. Qiu, and M.-M. Cheng	1415
<i>Locally Connected Network for Monocular 3D Human Pose Estimation</i> H. Ci, X. Ma, C. Wang, and Y. Wang	1429
<i>Meta-Transfer Learning Through Hard Tasks</i> Q. Sun, Y. Liu, Z. Chen, T.-S. Chua, and B. Schiele	1443
<i>MHF-Net: An Interpretable Deep Network for Multispectral and Hyperspectral Image Fusion</i> Q. Xie, M. Zhou, Q. Zhao, Z. Xu, and D. Meng	1457
<i>Multi-Task Learning With Coarse Priors for Robust Part-Aware Person Re-Identification</i> C. Ding, K. Wang, P. Wang, and D. Tao.....	1474
<i>Neural Rendering for Game Character Auto-Creation</i> T. Shi, Z. Zou, Z. Shi, and Y. Yuan	1489
<i>Quasi-Globally Optimal and Near/True Real-Time Vanishing Point Estimation in Manhattan World</i> H. Li, J. Zhao, J.-C. Bazin, and Y.-H. Liu	1503
<i>Real-Time Globally Consistent Dense 3D Reconstruction With Online Texturing</i> L. Han, S. Gu, D. Zhong, S. Quan, and L. Fang.....	1519
<i>Scalable Variational Gaussian Processes for Crowdsourcing: Glitch Detection in LIGO</i> P. Morales-Álvarez, P. Ruiz, S. Coughlin, R. Molina, and A.K. Katsaggelos	1534
<i>Semantic Object Accuracy for Generative Text-to-Image Synthesis</i> T. Hinz, S. Heinrich, and S. Wermter.....	1552
<i>SphereGAN: Sphere Generative Adversarial Network Based on Geometric Moment Matching and its Applications</i> S.W. Park and J. Kwon.....	1566
<i>Streaming Convolutional Neural Networks for End-to-End Learning With Multi-Megapixel Images</i> H. Pinckaers, B. van Ginneken, and G. Litjens	1581
<i>TapLab: A Fast Framework for Semantic Video Segmentation Tapping Into Compressed-Domain Knowledge</i> J. Feng, S. Li, X. Li, F. Wu, Q. Tian, M.-H. Yang, and H. Ling	1591
<i>Towards Partial Supervision for Generic Object Counting in Natural Scenes</i> H. Cholakkal, G. Sun, S. Khan, F.S. Khan, L. Shao, and L. Van Gool.....	1604

<i>Towards Robust Monocular Depth Estimation: Mixing Datasets for Zero-Shot Cross-Dataset Transfer</i> R. Ranftl, K. Lasinger, D. Hafner, K. Schindler, and V. Koltun.....	1623
<i>Unambiguous Text Localization, Retrieval, and Recognition for Cluttered Scenes</i> X. Rong, C. Yi, and Y. Tian.....	1638
<i>Unsupervised Domain Adaptation via Discriminative Manifold Propagation</i> Y.-W. Luo, C.-X. Ren, D.-Q. Dai, and H. Yan.....	1653
<i>Visual Grounding Via Accumulated Attention</i> C. Deng, Q. Wu, Q. Wu, F. Hu, F. Lyu, and M. Tan	1670



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: William D. Gropp; **President-Elect:** Nita Patel; **Past President:** Forrest Shull; **First VP:** Riccardo Mariani; **Second VP:** David Ebert; **Secretary:** Jyotika Athavale; **Treasurer:** Michela Taufer; **VP, Membership & Geographic Activities:** Andre Oboler; **VP, Professional & Educational Activities:** Hironori Washizaki; **VP, Publications:** David Ebert; **VP, Standards Activities:** Annette Reilly; **VP, Technical & Conference Activities:** Grace Lewis; **2021-2022 IEEE Division VIII Director:** Christina M. Schober; **2022-2023 IEEE Division V Director:** Cecilia Metra; **2022 IEEE Division VIII Director-Elect:** Leila De Florian

BOARD OF GOVERNORS

Term Expiring 2022: Nils Aschenbruck, Ernesto Cuadros-Vargas, David S. Ebert, Grace Lewis, Hironori Washizaki, Stefano Zanero
Term Expiring 2023: Jyotika Athavale, Terry Benzal, Takako Hashimoto, Irene Pazos Viana, Annette Reilly, Deborah Silver
Term Expiring 2024: Saurabh Bagchi, Charles (Chuck) Hansen, Carlos E. Jimenez-Gomez, Daniel S. Katz, Shixia Liu, Cyril Onwubiko

revised 19 January 2022

BOARD OF GOVERNORS MEETING

1-3 February 2022

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 Tubbs; **Director, Membership & Education:** Eric Berkowitz; **Director, Periodicals & Special Projects:** Robin Baldwin

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: K.J. Ray Liu; **President-Elect:** Saifur Rahman; **Past President:** Susan K. "Kathy" Land; **Secretary:** John W. Walz; **Treasurer:** Mary Ellen Randall; **Director & President, IEEE-USA:** Deborah M. Cooper; **Director & President, Standards Association:** James E. Matthews; **Director & VP, Educational Activities:** Stephen M. Phillips; **Director & VP, Membership and Geographic Activities:** David A. Koehler; **Director & VP, Publication Services & Products:** Lawrence O. Hall; **Director & VP, Technical Activities:** Bruno Meyer

