

# IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE

*A publication of the IEEE Computer Society*

NOVEMBER 2015

VOLUME 37

NUMBER 11

ITPIDJ

(ISSN 0162-8828)

## REGULAR PAPERS

<i>An Efficient Algorithm for Calculating the Exact Hausdorff Distance</i> A.A. Taha and A. Hanbury.....	2153
<i>Difference Subspace and Its Generalization for Subspace-Based Methods</i> K. Fukui and A. Maki.....	2164
<i>Fusion of Range and Stereo Data for High-Resolution Scene-Modeling</i> G.D. Evangelidis, M. Hansard, and R. Horaud.....	2178
<i>Geometric Change Detection in Urban Environments Using Images</i> A. Taneja, L. Ballan, and M. Pollefeys.....	2193
<i>Laplacian Scale-Space Behavior of Planar Curve Corners</i> X. Zhang, Y. Qu, D. Yang, H. Wang, and J. Kymer.....	2207
<i>Learning Shared, Discriminative, and Compact Representations for Visual Recognition</i> H. Lobel, R. Vidal, and A. Soto.....	2218
<i>Multi-View and 3D Deformable Part Models</i> B. Pepik, M. Stark, P. Gehler, and B. Schiele.....	2232
<i>Optimal Mass Transport for Shape Matching and Comparison</i> Z. Su, Y. Wang, R. Shi, W. Zeng, J. Sun, F. Luo, and X. Gu.....	2246
<i>Probabilistic ToF and Stereo Data Fusion Based on Mixed Pixels Measurement Models</i> C.D. Mutto, P. Zanuttigh, and G.M. Cortelazzo.....	2260
<i>Robust Estimation of Unbalanced Mixture Models on Samples with Outliers</i> A. Galimzianova, F. Pernuš, B. Likar, and Ž. Špiclin.....	2273
<i>Semi-Automatic Segmentation of Prostate in CT Images via Coupled Feature Representation and Spatial-Constrained Transductive Lasso</i> Y. Shi, Y. Gao, S. Liao, D. Zhang, Y. Gao, and D. Shen.....	2286
<i>Spherical Hashing: Binary Code Embedding with Hyperspheres</i> J.-P. Heo, Y. Lee, J. He, S.-F. Chang, and S.-E. Yoon.....	2304
<i>Supervised Hashing Using Graph Cuts and Boosted Decision Trees</i> G. Lin, C. Shen, and A. van den Hengel.....	2317

*(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

 MEDLINE  
U.S. National Library of Medicine

 PubMed

 IEEE  
computer  
society

www.computer.org  
tpami@computer.org

 IEEE

(Contents continued from front cover)

<i>Transductive Multi-View Zero-Shot Learning</i> Y. Fu, T.M. Hospedales, T. Xiang, and S. Gong .....	2332
<i>Visual Place Recognition with Repetitive Structures</i> A. Torii, J. Sivic, M. Okutomi, and T. Pajdla .....	2346
<hr/>	
<i>Call for Papers for Special Issue on Learning with Shared Information for Computer Vision and Multimedia Analysis</i> .....	2360

## IEEE computer society

**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.

**COMPUTER SOCIETY WEBSITE:** [www.computer.org](http://www.computer.org)

**Next Board Meeting:** 15–16 November 2015, New Brunswick, NJ, USA

### EXECUTIVE COMMITTEE

**President:** Thomas M. Conte

**President-Elect:** Roger U. Fujii; **Past President:** Dejan S. Milojicic;

**Secretary:** Cecilia Metra; **Treasurer, 2nd VP:** David S. Ebert; **1st VP,**

**Member & Geographic Activities:** Elizabeth L. Burd; **VP, Publications:**

Jean-Luc Gaudiot; **VP, Professional & Educational Activities:** Charlene

(Chuck) Walrad; **VP, Standards Activities:** Don Wright; **VP, Technical**

**& Conference Activities:** Phillip A. Laplante; **2015–2016 IEEE Director**

**& Delegate Division VIII:** John W. Walz; **2014–2015 IEEE Director &**

**Delegate Division V:** Susan K. (Kathy) Land; **2015 IEEE Director-Elect &**

**Delegate Division V:** Harold Javid

### BOARD OF GOVERNORS

**Term Expiring 2015:** Ann DeMarle, Cecilia Metra, Nita Patel, Diomidis

Spinellis, Phillip A. Laplante, Jean-Luc Gaudiot, Stefano Zanero

**Term Expiring 2016:** David A. Bader, Pierre Bourque, Dennis J. Frailey,

Jill I. Gostin, Atsuhiko Goto, Rob Reilly, Christina M. Schober

**Term Expiring 2017:** David Lomet, Ming C. Lin, Gregory T. Byrd, Alfredo

Benso, Forrest Shull, Fabrizio Lombardi, Hausi A. Muller

### EXECUTIVE STAFF

**Executive Director:** Angela R. Burgess; **Director, Governance & Associate**

**Executive Director:** Anne Marie Kelly; **Director, Finance & Accounting:**

Sunny Hwang; **Director, Information Technology Services:** Ray Kahn;

**Director, Membership:** Eric Berkowitz; **Director, Products & Services:**

Evan M. Butterfield; **Director, Sales & Marketing:** Chris Jensen

### 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:** [hq.ofc@computer.org](mailto:hq.ofc@computer.org)

**Los Alamitos:** 10662 Los Vaqueros Circle, Los Alamitos, CA 90720

**Phone:** +1 714 821 8380 • **Email:** [help@computer.org](mailto:help@computer.org)

### MEMBERSHIP & PUBLICATION ORDERS

**Phone:** +1 800 272 6657 • **Fax:** +1 714 821 4641 • **Email:** [help@computer.org](mailto:help@computer.org)

**Asia/Pacific:** Watanabe Building, 1-4-2 Minami-Aoyama, Minato-ku, Tokyo

107-0062, Japan • **Phone:** +81 3 3408 3118 • **Fax:** +81 3 3408 3553 •

**Email:** [tokyo.ofc@computer.org](mailto:tokyo.ofc@computer.org)

### IEEE BOARD OF DIRECTORS

**President & CEO:** Howard E. Michel; **President-Elect:** Barry L. Shoop; **Past**

**President:** J. Roberto de Marca; **Director & Secretary:** Parviz Famouri;

**Director & Treasurer:** Jerry Hudgins; **Director & President, IEEE-USA:**

James A. Jefferies; **Director & President, Standards Association:** Bruce P.

Kraemer; **Director & VP, Educational Activities:** Saurabh Sinha; **Director &**

**VP, Membership and Geographic Activities:** Wai-Choong Wong; **Director**

**& VP, Publication Services and Products:** Sheila Hemami; **Director & VP,**

**Technical Activities:** Vincenzo Piuri; **Director & Delegate Division V:**

Susan K. (Kathy) Land; **Director & Delegate Division VIII:** John W. Walz

revised 5 June 2015

