22

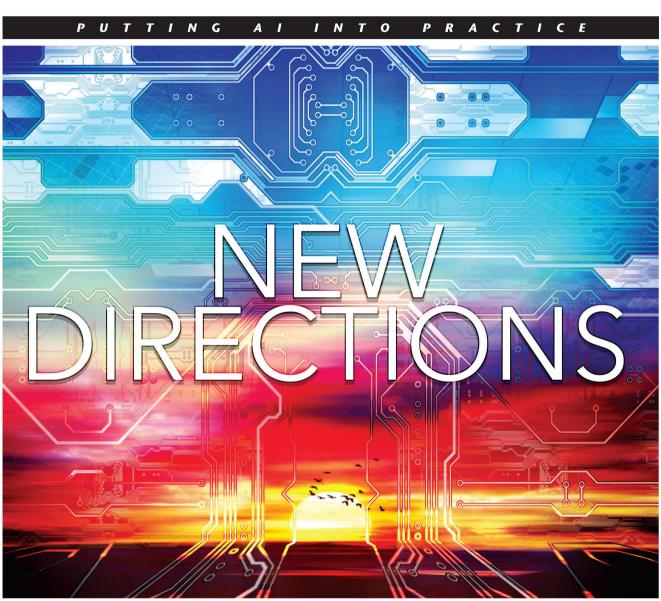


Also in this issue:

Minimizing Fatigue Damage in Aircraft Structures

Finding Gender-Specific Meaning 62

Real-Time Traffic Control 68







ontents

JULY/AUGUST 2016

Volume 31, Number 4

IEEE Intelligent Systems provides peer-reviewed, cutting-edge articles on the theory and application of systems that perceive, reason, learn, and act intelligently.

ARTICLES

User Interfaces

Semantics-Based Intelligent Human-Computer Interaction Valentina Gatteschi, Fabrizio Lamberti, Paolo Montuschi, and Andrea Sanna

Machine Learning

Minimizing Fatigue Damage in Aircraft Structures Marja Ruotsalainen, Juha Jylhä, and Ari Visa

Logic

Satisfiability Degree Analysis and Deductive Reasoning 30 Kueiming Lo, Chongyuan Yin, and Jian Luo

Feedback

Transfer Learning for Heterogeneous One-Class Collaborative Filtering Weike Pan, Mengsi Liu, and Zhong Ming



Cover illustration: David Angel

changes to IEEE Intelligent Systems, Membership endorsement of any third-party products or services. Processing Dept., IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854-4141. Periodicals Postage Paid at New York, NY, and at additional mailing offices. Canadian GST #125634188. Canada Post Publications Mail Agreement Number 40013885. Return undeliverable Canadian addresses to 4960-2 Walker Rd., Windsor, ON N9A 6J3. Printed in the USA. Reuse Rights and Reprint Permissions: Educational or personal use of this material is permitted without fee, provided such use 1) is not made for profit, 2) includes IEEE. For more information, please go to http://www.

Postmaster: Send undelivered copies and address the first page of the copy, and 3) does not imply IEEE paperversion policy, html. Permission to reprint/republish Authors and their companies are permitted to post the accepted version of IEEE-copyrighted material on their own Web servers without permission, provided that the IEEE copyright notice and a full citation to the original work appear on the first screen of the posted copy.

An accepted manuscript is a version that has been revised by the author to incorporate review suggestions but not the published version with copyediting, proofreading, and formatting added by

this material for commercial, advertising, or promotional purposes or for creating new collective works for resale or redistribution must be obtained from IEEE by writing to the IEEE Intellectual Property Rights Office, 445 Hoes Lane, Piscataway, NJ 08854-4141 or pubs-permissions@ ieee.org. Copyright © 2016 IEEE. All rights reserved. Abstracting and Library Use: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy for private use of patrons, provided the per-copy fee indicated in the code at the bottom of the first page is paid through the Copyright Clearance this notice and a full citation to the original work on ieee.org/publications_standards/publications/rights/ Center, 222 Rosewood Drive, Danvers, MA 01923.

www.computer.org/intelligent

DEPARTMENTS

Expert Opinion

Victor Pankratius, Justin Li, Michael Gowanlock, David M. Blair, Cody Rude, Tom Herring, Frank Lind, Philip J. Erickson, and

Computer-Aided Discovery: Toward Scientific Insight Generation with Machine Support

50 **Human-Centered Computing**

David Z. Hambrick and Robert R. Hoffman Expertise: A Second Look

56 AI and Sustainability

Douglas H. Fisher

Recent Advances in AI for Computational Sustainability

62 **Affective Computing and Sentiment Analysis**

> Rada Mihalcea and Aparna Garimella What Men Say, What Women Hear: Finding Gender-Specific Meaning Shades

68 Intelligent Transportation Systems

> Cristina Vilarinho, José Pedro Tavares, and Rosaldo J.F. Rossetti Design of a Multiagent System for Real-Time Traffic Control

81 Al Innovation in Industry

Daniel E. O'Leary Ethics for Big Data and Analytics

Advertiser Index

Inside Back Cover

IEEE Computer Society Information

Circulation: IEEE Intelligent Systems (ISSN 1541-1672) is published bimonthly by the IEEE Computer Society. IEEE Headquarters, Three Park Ave., 17th Floor, New York, NY 10016-5997; IEEE Computer Society Publications Office, 10662 Los Vaqueros Circle, P.O. Box 3014, Los Alamitos, CA 90720-1314, phone +1 714 821 8380; IEEE Computer Society Headquarters, 2001 L St., Ste. 700, Washington, D.C. 20036-4910. Subscription rates: To subscribe to IEEE Intelligent Systems, visit www.computer.org/intelligentsystems



Intelligent Systems

Editor in Chief Daniel D. Zeng

University of Arizona

Associate Editor in Chief Bhavani Thuraisingham

University of Texas at Dallas **Editor in Chief Emeritus**

Fei-Yue Wang

Chinese Academy of Sciences

EDITORIAL BOARD

Ahmed Abbasi University of Virgina **Russ Biagio Altman** Stanford University **Richard Benjamins** Telefónica R&D

Longbing Cao University of Technology, Sydney, Australia Úlrich Furbach

University of Koblenz Ashok Goel Georgia Institute

of Technology James V. Hansen

Brigham Young University Robert R. Hoffman

Institute for Human and Machine Cognition Heng Ji

Subbarao Kambhampati

Arizona State University Lefei Li Tsinghua University

Ee-Peng Lim Singapore Management University Sean Luke

George Mason University

Wenji Mao Chinese Academy of Sciences Enrico Motta

Open University Daniel B. Neill

Carnegie Mellon University

Natasha Noy Stanford University

Terry Payne University of Southampton **Raymond Perrault**

SRI International **Alun Preece** Cardiff University

David Skillicorn Queen's University Canada

Alessandro Sperduti University of Padova, Italy Jaideep Srivastava

University of Minnesota Steffen Staab University Koblenz-Landau

V.S. Subrahmanian University of Maryland Fei-Yue Wang

Chinese Academy of Sciences

Ronald Yager Iona College **Qiang Yang**

Hong Kong University of Science and Technology Junping Zhang

Fudan University Hai Zhuge Chinese Academy of

Sciences **Chengqing Zong**

National Laboratory of Pattern Recognition, China Ning Zhong Maebashi Institute of

Technology

ADVISORY BOARD

James Hendler (chair) Rensselaer Polytechnic Institute

Richard J. Doyle Jet Propulsion Lab **Dieter Fensel**

University of Innsbruck C. Lee Giles

Pennsylvania State University

Haym Hirsh Rutgers University **Éric Horvitz**

Microsoft Research Robert Laddaga BBN Technologies Richard H. Lathrop

University of California, Irvine

Peter Norvig Google

Daniel E. O'Leary University of Southern California

Nigel Shadbolt University of Southampton

Rudi Studer University of Karlsruhe William R. Swartout

University of Southern California

Austin Tate University of Edinburgh

CS MAGAZINE OPERATIONS COMMITTEE

Forrest Shull (chair), Brian Blake, Maria Ebling, Lieven Eeckhout, Miguel Encarnacao, Nathan Ensmenger, Sumi Helal, San Murugesan, Ahmad-Reza Sadeghi, Yong Rui, Diomidis Spinellis, George K. Thiruvathukal, Mazin Yousif, Daniel Zeng

CS PUBLICATIONS BOARD

David S. Ebert (VP for Publications), Alain April, Alfredo Benso, Laxmi Bhuyan, Greg Byrd, Robert Dupuis, David S. Ebert, Ming C. Lin, Linda I. Shafer, Forrest Shull, H.J. Siegel

