PROCEEDINGS OF SPIE

Machine Intelligence and Bio-inspired Computation: Theory and Applications X

Misty Blowers Jonathan Williams Russell D. Hall Editors

20 April 2016 Baltimore, Maryland, United States

Sponsored and Published by SPIE

Volume 9850

Proceedings of SPIE 0277-786X, V. 9850

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Machine Intelligence and Bio-inspired Computation: Theory and Applications X, edited by Misty Blowers, Jonathan Williams, Russell D. Hall, Proc. of SPIE Vol. 9850, 985001 \cdot © 2016 SPIE \cdot CCC code: 0277-786X/16/\$18 \cdot doi: 10.1117/12.2244802

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in Machine Intelligence and Bio-inspired Computation: Theory and Applications X, edited by Misty Blowers, Jonathan Williams, Russell D. Hall, Proceedings of SPIE Vol. 9850 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic) ISBN: 9781510600911

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org

Copyright © 2016, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/16/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a six-digit CID article numbering system structured as follows:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

v vii	Authors Conference Committee
	INNOVATIONS IN APPLIED RESEARCH
9850 04	Function and activity classification in network traffic data: existing methods, their weaknesses, and a path forward [9850-4]
9850 05	Critical node analysis (CNA) of electrical infrastructure networks [9850-5]
9850 06	Comparison of artificial intelligence classifiers for SIP attack data [9850-6]
9850 07	Optimized hardware framework of MLP with random hidden layers for classification applications [9850-7]
	SIGNAL CLASSIFICATION
9850 09	Applying data mining techniques to detect abnormal flight characteristics [9850-9]
9850 0A	Self-organizing map classifier for stressed speech recognition [9850-10]
9850 OB	One approach to design of speech emotion database [9850-11]
9850 0C	Optimization of multilayer neural network parameters for speaker recognition [9850-12]
9850 0D	Silicon nanophotonic networks for quantum optical information processing [9850-13]

Proc. of SPIE Vol. 9850 985001-4

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Aslaner, H. Emre, 09 Bennette, Walter, 05 Chmelikova, Zdenka, OB, OC Hach, Edwin E., III, 0D lyigun, Cem, 09 Kudithipudi, Dhireesha, 07 Levchuk, Georgiy, 04 Merkel, Cory, 07 Partila, Pavol, 0A, 0B, 0C Ramesh, Abhishek, 07 Rozhon, Jan, 0C Safarik, Jakub, 06 Skapa, Jan, 0C Slachta, Jiri, 06 Tovarek, Jaromir, 0A, 0B, 0C Uhrin, Dominik, OB, OC Unal, Cagri, 09 Venkateswaran, Venkat, 05 Voznak, Miroslav, OA, OB, OC Zyarah, Abdullah M., 07

Proc. of SPIE Vol. 9850 985001-6

Conference Committee

Symposium Chair

David A. Logan, BAE Systems (United States)

Symposium Co-chair

Donald A. Reago Jr., U.S. Army Night Vision & Electronic Sensors Directorate (United States)

Conference Chairs

Misty Blowers, Air Force Research Laboratory (United States)
Jonathan Williams, Air Force Research Laboratory (United States)
Russell D. Hall, Northrop Grumman Corporation (United States)

Conference Program Committee

Gus Anderson, MacAulay-Brown, Inc. (United States)
George E. Corbin, BAE Systems (United States)
Georgiy M. Levchuk, Aptima, Inc. (United States)
John A. Marsh, State University of New York Institute of Technology (United States)

Session Chairs

- 1 Theoretical and Fundamental Research Gustave W. Anderson, Lockheed Martin Corporation (United States)
- 2 Innovations in Applied Research Georgiy M. Levchuk, Aptima, Inc. (United States)
- 3 Signal Classification
 Misty Blowers, Air Force Research Laboratory (United States)

Proc. of SPIE Vol. 9850 985001-8