PROCEEDINGS OF SPIE

Emerging Topics in Artificial Intelligence (ETAI) 2024

Giovanni Volpe Joana B. Pereira Daniel Brunner Aydogan Ozcan Editors

18–23 August 2024 San Diego, California, United States

Sponsored by SPIE

Cosponsored by G-Research (United Kingdom)

Published by SPIE

Volume 13118

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 *Emerging Topics in Artificial Intelligence (ETAI) 2024*, edited by Giovanni Volpe, Joana B. Pereira, Daniel Brunner, Aydogan Ozcan, Proc. of SPIE 13118, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510678965

ISBN: 9781510678972 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

31 IL.UIG

Copyright © 2024 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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 seven-digit CID article numbering system structured as follows:

- The first five 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 Conference Committee

	NEUROMORPHIC COMPUTING I
13118 02	Use of a delayed input for simple and effective optimisation of physical reservoir computers [13118-4]
	ETAI AND OTOM I: JOINT SESSION WITH 13112 AND 13118
13118 03	Al-driven multicore fiber-optic cell rotation (Invited Paper) [13118-11]
	BIOMEDICAL APPLICATIONS III
13118 04	Leveraging a memory-driven transformer for efficient radiology report generation from chest x-rays to establish a quantitative metric [13118-19]
13118 05	Functional connectivity-based classification of autism spectrum disorder using mutual connectivity analysis with local models [13118-20]
	MICROSCOPY AND PHOTONICS WITH AI I
13118 07	Deep-learning-based acquisitional denoising for Raman spectroscopy using CNN and transformer [13118-37]
	TOWARDS THE UTILIZATION OF AI
13118 08	All-optical control-flow and enhancement of optical neural networks (Invited Paper) [13118-45]
	PHYSICS-INFORMED AND INTERPRETABLE AI I
13118 09	Harnessing nonlinear broadening dynamics in single-mode fibers for neuromorphic computing (Invited Paper) [13118-48]

PHYSICS-INFORMED AND INTERPRETABLE ALIII

	PHYSICS-INFORMED AND INTERPRETABLE AT III
13118 0A	Detective AI: distinguishing AI generated and real images by leveraging the concept of cross-correlation of connected image components of bit-planes [13118-56]
	POSTER SESSION
13118 OB	Simulating and predicting entangled DNA contours via deep learning [13118-64]
13118 0C	tIFFS: an approach to define a theoretically infinite family of feature space for an artificial intelligence framework [13118-68]
13118 0D	Colony of AI: towards building families of AI-agents using theory of genetic algorithm and bias randomization [13118-73]