## PROCEEDINGS OF SPIE

## International Conference on Algorithms, High Performance Computing, and Artificial Intelligence (AHPCAI 2021)

Lei Zhang Mahmoud AlShawabkeh Editors

19–21 November 2021 Sanya, China

Organized by Henan College Graduation Employment Promotion Association (China)

Sponsored by AEIC Academic Exchange Information Center Zhengzhou University (China) Henan University (China) Henan Polytechnic University (China) Henan University of Sciencce and Technology (China) North China University of Water Resources and Electric Power (China)

Published by SPIE

Volume 12156

Proceedings of SPIE 0277-786X, V. 12156

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

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 International Conference on Algorithms, High Performance Computing, and Artificial Intelligence (AHPCAI 2021), edited by Lei Zhang, Mahmoud AlShawabkeh, Proc. of SPIE 12156, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510651883 ISBN: 9781510651890 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2021 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

## ARTIFICIAL INTELLIGENCE ALGORITHMS AND DEEP LEARNING APPLICATIONS

12156 02	A load balancing parallel algorithm for solving large-scale tridiagonal linear systems [12156-18]
12156 03	Research on short video recommendation algorithm based on social network [12156-15]
12156 04	Trajectory tracking of the robot manipulator with time-varying parameters [12156-9]
12156 05	Research on application of artificial intelligence in basketball [12156-23]
12156 06	Research and implementation of intelligent monitoring system for epidemic prevention robot [12156-41]
12156 07	An improved Hibbard interpolation algorithm based on edge judgement [12156-29]
12156 08	Machine learning method to solve the credit decision-making problem of small and medium- sized enterprises [12156-28]
12156 09	AWP-GAC: central-controlled actor-critic for multi-agent dynamic game environment [12156-27]
12156 0A	Reinforcement learning with teacher-student framework in future market [12156-8]
12156 OB	High-quality dense SLAM approach from deep learning and monocular-inertial measurements [12156-32]
12156 OC	Research on task assignment of cruise ammunition cooperative attack based on dragonfly algorithm [12156-7]
12156 0D	Feature extraction algorithm for payload based on tree structure representation [12156-45]
12156 OE	Collaborative filtering algorithm combining trust relationship and item preference [12156-24]
12156 OF	A comparative study of recently deep learning optimizers [12156-13]
12156 0G	TextRank keyword extraction method weighted by multivariate quantitative indexes [12156-56]
12156 OH	VHR imagery change detection using UNet based on fusion of residual polymer and attention mechanism [12156-22]
12156 01	Research on rock sample lithology identification algorithm based on ResNet self-supervised learning [12156-54]

12156 OJ	Incorporating lexicon knowledge into Chinese NER using hierarchical meta-embedding [12156-42]
12156 OK	A novel method for spatial frequent items query based on concept lattice [12156-19]
12156 OL	Practical study on the semantic analysis algorithm based on text classification [12156-58]
12156 OM	Encrypted transmission method of sensitive data in energy big data center based on AES algorithm [12156-20]
12156 ON	Dynamic attention network for multi-UAV reinforcement learning [12156-17]
12156 00	An oblique-enhanced interpolation algorithm for color image restoration [12156-36]
12156 OP	Research on Markov chain and PageRank algorithm [12156-62]
12156 OQ	Research on optimal operation and dispatch strategy of high proportion new energy generation [12156-53]
12156 OR	Annual precipitation forecast of Guangzhou based on genetic algorithm and backpropagation neural network (GA-BP) [12156-30]
12156 OS	Comparative study on the effectiveness of trajectory similarity measurement algorithms [12156-5]
12156 OU	Application of industrial robots in stamping automation production line [12156-66]
12156 OV	Preliminary study on registration of natural resource assets in national park based on artificial intelligence technology [12156-60]
12156 OW	Identification analysis and traceability application of food in key fields based on artificial intelligence [12156-59]
12156 OX	Smart grid information security evaluation method based on risk weight algorithm [12156-67]
	DATA ANALYSIS AND MODEL PREDICTION IMAGE PROCESSING

. ..

- 12156 0Y Matrix decomposition model of E-commerce based on collaborative filtering algorithm [12156-51]
- 12156 0Z A supervised learning method for extracting and classifying EEG data [12156-44]
- 12156 10 Application research of digital assembly system of marine turbocharger based on VR/AR [12156-37]
- 12156 11 Research on price prediction of natural gas futures using LSTM neural network [12156-40]

. . . . . . .

- 12156 12 Convolutional neural network in predicting electrocardiogram [12156-43]
- 1215613 Optimization for overfitting problems in spam email classification based on parameter adjusting [12156-25]
- 12156 14 Binary classification for atrial fibrillation detection from ECG-based signals using 1Dconvolutional neural network [12156-33]
- 12156 15 Machine learning methods in predicting electroencephalogram [12156-48]
- 1215616 Image enhancement method based on perceptual excitation mapping and gradient attenuation [12156-35]
- 12156 17 An interpolation algorithm with dynamic-weighting for color image restoration [12156-69]
- 12156 18 Cloud detection of space-borne video remote sensing using improved Unet method [12156-47]
- 12156 1A Multi objective optimization model of demand side resource aggregation in market environment [12156-6]
- 12156 1B Study on abnormal well pressure data [12156-1]
- 12156 1C Feature fusion graph attention network for link prediction [12156-34]
- 12156 1D Research on the math modeling of predicting the optimal routine of transportation [12156-49]
- 12156 1E Application of big data theory in test technology of high precision inertial navigation system [12156-21]
- 12156 1F Research on air quality prediction based on BP neural network [12156-55]
- 12156 1G Land cover type classification study based on airborne LiDAR and Sentinel-2 image data [12156-4]
- 12156 1H Analysis of rainfall distribution in watershed based on GIS [12156-57]
- 12156 11 Detection of Ruditapes Philippinarum contaminated by heavy metals based on hyperspectral image and multilayer perceptron [12156-3]
- 12156 1J Research on the national vulnerability of climate change based on principal component analysis [12156-2]
- 12156 1K Simulation of chlorophyll-a concentration in Donghu Lake based on GA-ELM and multiple water quality indexes [12156-26]
- 12156 1L Leg strength analysis for wind turbine units [12156-31]
- 12156 1M Integrative security protection system for full life cycle of big data based on SM crypto algorithm [12156-63]

- 12156 1N Construction of art design intelligent system based on extensibility [12156-65]
- 12156 10 6D object pose estimation based on the attention mechanism [12156-61]