PROCEEDINGS OF SPIE

Fifth International Conference on Artificial Intelligence and Computer Science (AICS 2023)

Habib Zaidi
Yuriy S. Shmaliy
Hongying Meng
Hoshang Kolivand
Yougang Sun
Jianping Luo
Mamoun Alazab
Editors

26–28 July 2023
Wuhan, China

Organized by
Hubei Zhongke Institute of Geology and Environment Technology (China)

Published by
SPIE

Volume 12803

Part One of Two Parts

Proceedings of SPIE 0277-786X, V. 12803

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 *Fifth International Conference on Artificial Intelligence and Computer Science (AICS 2023)*, edited by Habib Zaidi, Yuriy S. Shmaliy, Hongying Meng, Hoshang Kolivand, Yougang Sun, Jianping Luo, Mamoun Alazab, Proc. of SPIE 12803, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510668621
ISBN: 9781510668638 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2023 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.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

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

xi *Conference Committee*

Part One

ALGORITHM AND PROGRAMMING

12803 02 **Reliable node localization algorithm for WSN based on weighted AHP-GRA** [12803-12]

12803 03 **Infrared and color image fusion method based on guided filtering** [12803-38]

12803 04 **Prediction of existing tunnel deformation induced by shield undercrossing based on BO-Bi-LSTM** [12803-122]

12803 05 **Improved stacked-denoising auto encoder for tide image denoising** [12803-31]

12803 06 **Resnet-V: a residual networks classification algorithm of keratoconus** [12803-40]

12803 07 **Color image encryption algorithm with DNA coding and Zig-Zag transform based on fractional-order memristive circuit system** [12803-54]

12803 08 **TCP-QNCC: congestion control algorithm based on deep Q-network** [12803-58]

12803 09 **A fast Apriori algorithm for telecom fraud** [12803-60]

12803 0A **Lithology identification algorithm of cuttings based on one-dimensional convolutional neural network for mineral element content data** [12803-74]

12803 0B **Research on rock image classification algorithm based on multi-task learning and pseudo-labels** [12803-71]

12803 0C **Research on intelligent recognition algorithm for common roadbed diseases based on radar images** [12803-72]

12803 0D **Pre-planning of individualized talus implants based on computed tomography-automated segmentation** [12803-81]

12803 0E **Mining order-preserving submatrix based on charm for gene expression data** [12803-82]

12803 0F **An improved watershed algorithm and its application in image edge extraction** [12803-83]

12803 0G **Research on augmented reality registration method based on SA-PSO algorithm** [12803-95]

12803 0H **A personalized test paper generation model for English examination based on knowledge tracking** [12803-92]

12803 0I **Improved ACLPSO algorithm for automatic parameter optimization** [12803-100]

12803 0J **Deep learning fusion model and reliability analysis** [12803-103]

12803 0K **Method for solving ordinary differential equations of a neural network combined with the ReLU function** [12803-105]

12803 0L **Pedestrian re-identification domain generalization algorithm based on causal strong and weak alignment** [12803-109]

12803 0M **Emotional analysis and prediction based on online book user comments** [12803-116]

12803 0N **An efficient point cloud semantic segmentation framework based on superpoint fusion and joint feature learning** [12803-119]

12803 0O **Attitude prediction of shield machine based on BO-CatBoost** [12803-130]

12803 0P **Analysis of parallel helix tension measurement based on frequency domain reflection method** [12803-136]

12803 0Q **Detection of cigar appearance defects based on improved YOLOv5** [12803-129]

12803 0R **Vehicle routing model and algorithms for scarce emergency supplies distribution within a city** [12803-17]

12803 0S **IM-AEPCI: iterative measurement using automatic exposure point cloud imaging for autonomous refueling robot vision guide** [12803-121]

12803 0T **Acupoint classification method based on improved support vector machine** [12803-118]

12803 0U **Neuron importance algorithm for continual learning** [12803-107]

12803 0V **Research on lightweight safety protection methods for vehicle bus communication** [12803-26]

12803 0W **Research on foreground subject segmentation algorithm with high similarity of foreground background** [12803-104]

12803 0X **Research on automated valet parking scene visual feature map generation algorithm based on LiDAR SLAM** [12803-102]

12803 0Y **Research on a short-term traffic flow prediction method** [12803-94]

12803 0Z **Implementation of monocular 2D EKF-vSLAM algorithm** [12803-93]

12803 10 **A dynamic road network conversion method for solving shortest reliable paths** [12803-89]

12803 11 **A social friend selection method based on interest and social behavior** [12803-3]

12803 12 **Generalized fuzzy *k*-pseudo metric and its representation theorem** [12803-68]

COMPUTING AND MODELLING

12803 13 **Implementation of ternary stateful logic based on ternary memristor** [12803-37]

12803 14 **Cloud-edge collaborative lightweight edge container image storage** [12803-43]

12803 15 **Fundamental characteristics and arrival curve modeling of live streaming traffic via 5G NR system based on OAI platform** [12803-49]

12803 16 **ISAR image evaluation method based on visual perception supervised learning** [12803-87]

12803 17 **Research on the lane line detection method based on YOLOv5** [12803-90]

12803 18 **Research on NER model for coal mine safety hazards based on BERT-CNN-BiGRUs-CRF** [12803-98]

12803 19 **A people-item relation extraction method based on multiple kernel support vector machine model** [12803-115]

12803 1A **Constructing the prediction model for oil well wax deposition and its application** [12803-120]

12803 1B **Data-driven simulation of reservoir dynamics based on erroneous inputs from fast supply streamline data** [12803-131]

12803 1C **Design and implementation of intelligent analysis equipment for non-coal mine safety risk based on edge computing** [12803-133]

12803 1D **Research on intrusion classification detection based on IDA-CNN** [12803-134]

12803 1E **Trajectory-aware intelligent service migration in vehicular edge network** [12803-114]

12803 1F **A compositional model for cross-project effort-aware defect prediction** [12803-99]

12803 1G **An integrated BCI-VR system design with game for motor imagery** [12803-96]

12803 1H **Dynamic access control model based on attribute reachability** [12803-91]

12803 1I **Prediction for bike-sharing demand in London using multiple linear regression and random forest** [12803-85]

12803 1J **Effectiveness evaluation method of high-orbit infrared remote sensing satellite** [12803-145]

IMAGING AND PROCESSING

12803 1K **Beach erosion monitoring based on interferometric synthetic aperture radar** [12803-6]

12803 1L **Study on biomechanical characteristics of lower limbs in Tai Chi, Baduanjin, and walking gait based on the AnyBody simulations** [12803-9]

12803 1M **Improved method for position detection of monocular mechanical turntable based on binocular vision technology** [12803-10]

12803 1N **Fusing spectral feature and local texture feature for small sample hyperspectral remote sensing image classification** [12803-59]

12803 1O **Analysis of Labanotation generation based on motion capture data** [12803-64]

12803 1P **An improved method for blind navigation based on image-to-sound conversion** [12803-1]

12803 1Q **Mix Transformer depth-wise separable convolution UNet for breast mass segmentation in mammographic** [12803-144]

12803 1R **A mask-guided generation learning loss optimization method for person re-identification** [12803-80]

12803 1S **A local color transfer method based on optimal transmission** [12803-101]

12803 1T **FTIDB: a new flue-cured tobacco leaf image database** [12803-135]

12803 1U **Beyond animal detection: a benchmark for detecting animal age group** [12803-132]

12803 1V **A semantic segmentation method for power transmission line point clouds based on PointNet++** [12803-108]

Part Two

SENSORS AND COMPUTER SYSTEMS

12803 1W **Mode-localized temperature sensor with ultrahigh sensitivity** [12803-29]

12803 1X **Design and implementation of a wireless irradiance transmission system based on STM32 microcontroller** [12803-69]

12803 1Y **Robot-based precision recognition of small parcels images: methodology and experimental analysis** [12803-97]

12803 1Z **Study on the heat dissipation characteristics and optimization strategy of micro projector** [12803-125]

12803 20 **Design of garbage cleaning robot in small water area** [12803-127]

12803 21 **Design and analysis of large load composite mobile structure** [12803-128]

12803 22 **Calibration of refueling robot based on binocular vision** [12803-117]

12803 23 **Pilot study on human-in-the-loop optimization of ankle exoskeleton assistance based on plantar pressure interaction** [12803-88]

12803 24 **Research and design of a wireless calibration device for measuring irradiance in solar aging test chambers** [12803-30]

INFORMATION TECHNOLOGY AND INFORMATIZATION

12803 25 **A complexity measurement technique for time-series based on improved KW entropy** [12803-140]

12803 26 **Research and implementation of title generation for news text** [12803-78]

12803 27 **Multimodal emotion recognition based on multilevel acoustic and textual information** [12803-84]

12803 28 **Security vulnerability analysis of metaverse in cyberspace** [12803-110]

12803 29 **A vehicle trajectory collection and query system based on crowd sensing** [12803-112]

12803 2A **RTGAC: RoBERTa-TCN-GRU-CRF combined attention mechanism for grammar error detection in spoken Chinese** [12803-137]

ARTIFICIAL INTELLIGENCE AND APPLICATIONS

12803 2B **A comprehensive assessment method based on improved principal component analysis** [12803-14]

12803 2C **Intelligent detection of spacecraft abnormal behavior based on feature dimensionality representation algorithm** [12803-13]

12803 2D **Research on intelligent combat decision making based on deep reinforcement learning** [12803-15]

12803 2E **Research on intelligent prediction of T-stage of rectal cancer based on multi-instance learning** [12803-18]

12803 2F **Mapping dominant tree species in western Yunnan by comparing three feature filtering methods** [12803-4]

12803 2G **HPC: hierarchical point cloud completion method based on multi-scale feature points and cross attention** [12803-5]

12803 2H **Knowledge graph construction of traditional Tibetan medicine formulas** [12803-25]

12803 2I **An improved YOLOv5-based method for UAV object detection** [12803-8]

12803 2J **Revolutionizing 3D point cloud segmentation: an innovative network utilizing multi-scale feature fusion** [12803-19]

12803 2K **Shipping index fitting and influencing factors extraction based on the Window-ARIMA-SVR hybrid model** [12803-11]

12803 2L **Research on traffic flow prediction method based on combination models** [12803-16]

12803 2M **A data fusion method based on weight iterative correction** [12803-20]

12803 2N **A new CAPTCHA based on facial expression recognition** [12803-21]

12803 2O **Vehicle detection algorithm for highway driving scenarios** [12803-22]

12803 2P **HD-PointNet: point cloud processing in higher dimensions** [12803-23]

12803 2Q **SQBA: sequential query-based blackbox attack** [12803-24]

12803 2R **Joined CNN and transformer network for thorax disease classification** [12803-27]

12803 2S **Research on recognition method of floating objects on water surface based on Mask R-CNN** [12803-28]

12803 2T **Design of reverse logistics network for retired power batteries** [12803-33]

12803 2U **Underwater search method based on graphic search** [12803-34]

12803 2V **Research on solution property of automatic production system scheduling problem under just-in-time environment** [12803-36]

12803 2W **Anomaly detection of rotary kiln sensor time series data based on deep learning** [12803-39]

12803 2X **Tourism named entity recognition method based on knowledge enhancement** [12803-41]

12803 2Y **Optimizing financial engineering time indicator using bionics computation algorithm and neural network** [12803-42]

12803 2Z **Anti-money laundering method based on hierarchical risk control knowledge graph** [12803-44]

12803 30 **A low-latency FPGA-based method for edge extraction of hot-rolled strip** [12803-45]

12803 31 **A semantic segmentation method for UAV image based on improved BiseNetv2** [12803-46]

12803 33 **Design of bridge health monitoring system based on WSN** [12803-47]

12803 34 **Research and design of intelligent detection robot system for fire pipeline based on STM32** [12803-48]

12803 35 **Neural network parameter optimization for model predictive direct speed control of PMSM** [12803-50]

12803 36 **Automatic wellbore data recognition method based on Levenshtein distance similarity and TF-IDF** [12803-62]

12803 37 **Optimization of ancient Chinese characters recognition in particular conditions** [12803-52]

12803 38 **Application of propensity score and random forest in the causal inference: the causality of stroke** [12803-53]

12803 39 **A subgraph interpretation generative model for knowledge graph link prediction based on uni-relation transformation** [12803-55]

12803 3A **Self-supervised structural damage detection method based on pretext tasks learning feature representations** [12803-56]

12803 3B **PPM: prompt-free prompt-tuning for multi-task learning** [12803-57]

12803 3C **A fault diagnosis technique based on EMD and CNN-LSTM** [12803-141]

12803 3D **VMSecDefender: virtual machine malicious processes detection by using GRU** [12803-61]

12803 3E **Method and data analysis based on ECG signal for emotion recognition** [12803-63]

12803 3F **Multi-stage context-guided semantic segmentation in construction sites** [12803-65]

12803 3G **NeuroVI-based snow ruts and drivable area detection on snow-covered road** [12803-66]

12803 3H **Power equipment fault entity recognition based on BERT-CRF model** [12803-67]

12803 3I **Heterogenous facility location games with entrance fees** [12803-70]

12803 3J **Research on intelligent detection of urban road subgrade disease based on deep learning algorithm** [12803-73]

12803 3K **Construction and application of knowledge graph for national defense mobilization potential data** [12803-75]

12803 3L **Research on SDN traffic anomaly detection technology based on knowledge graph** [12803-76]

12803 3M **Identification of unknown space-varying wavenumber in Helmholtz equation using physics-informed neural networks** [12803-77]

12803 3N **Research on $PM_{2.5}$ influencing factors of LSTM based on attention mechanism** [12803-86]

12803 3O **Solute transport in lacunar-canalicular system with different porosity** [12803-113]

12803 3P **Asymmetric quantization in hardware accelerator** [12803-123]

12803 3Q **Exploring human intention recognition based on human robot collaboration manufacturing toward safety production** [12803-139]

12803 3R **Trajectory classification-based car loan collection scoring model using a hierarchical CNN-LSTM method** [12803-7]

12803 3S **Artificial intelligence volleyball special test system based on deep learning and 3D imaging technology** [12803-142]

12803 3T **A novel feature combination screening method for Li-ion battery state of health prediction** [12803-143]

12803 3U **Prediction of shield tunneling parameters using a BO-XGBoost machine learning method** [12803-138]

12803 3V **RL-based adaptive live video streaming for academic event** [12803-124]

12803 3W **Obstacle avoidance and visual design of home intelligent robot based on ROS system** [12803-126]

12803 3X **Longitudinal safety control strategy for autonomous vehicles without signal-controlled intersection** [12803-111]

12803 3Y **Artificial intelligence medical device standards network based on social network analysis and TOPSIS method** [12803-106]

12803 3Z **Research on genetic analysis method of geotechnical materials based on big data** [12803-32]

12803 40 **Concentration training of MR shooting game plus AI tech on college students** [12803-35]

12803 41 **Students' preference on cognitive behavior in automotive marketing practice based on eye tracking analysis technology from neuroscience** [12803-51]