

PROCEEDINGS OF SPIE

***Third International Conference
on Artificial Intelligence, Virtual
Reality, and Visualization
(AIVRV 2023)***

**Yanan Sun
Bin Jiang**
Editors

**7–9 July 2023
Chongqing, China**

Organized by
Chongqing University (China)
Chongqing University of Technology (China)

Sponsored by
Chengdu University of Information Technology (China)
AEIC—Academic Exchange Information Centre (China)

Published by
SPIE

Volume 12923

Proceedings of SPIE 0277-786X, V. 12923

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 SPIDigitalLibrary.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 *Third International Conference on Artificial Intelligence, Virtual Reality, and Visualization (AIVRV 2023)*, edited by Yanan Sun, Bin Jiang, Proc. of SPIE 12923, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510671485

ISBN: 9781510671492 (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**

SPIDigitalLibrary.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

ix *Conference Committee*

ARTIFICIAL INTELLIGENCE RECOGNITION AND FUZZY CONTROL

- 12923 02 **Nameplate text recognition model based on attention mechanism** [12923-91]
- 12923 03 **Research of equipment combat simulation system** [12923-104]
- 12923 04 **An improved wildfire identification method based on Yolov7 and attention mechanism**
[12923-10]
- 12923 05 **Experiment design for skeleton-based pedestrian abnormal-behavior recognition** [12923-63]
- 12923 06 **A review of pedestrian pose recognition in cross-passages in public places** [12923-61]
- 12923 07 **Discriminative infinite fuzzy restricted Boltzmann machine learning for HRRPs classification**
[12923-59]
- 12923 08 **Research on tourism cross-language intention recognition method based on XLM-R** [12923-71]
- 12923 09 **Comparative studies of artificial neuron network in medicine** [12923-31]
- 12923 0A **Optimized scheduling of unmanned baggage transport vehicles in airports considering
battery degradation** [12923-4]
- 12923 0B **Temporal feature learning based on attention mechanism for gait recognition** [12923-75]
- 12923 0C **An efficient and privacy-preserving federal learning scheme** [12923-18]
- 12923 0D **Research on recommendation algorithm of private charging pile based on collaborative
filtering** [12923-92]
- 12923 0E **Design of dormitory management system based on fingerprint recognition** [12923-81]
- 12923 0F **Adaptive genetic simulated annealing algorithm for project demonstration scheduling
problem** [12923-27]
- 12923 0G **Research on the application of digital twin technology in smart highway real-time simulation**
[12923-21]
- 12923 0H **Research on key technologies of smart security check in urban rail transit** [12923-25]

- 12923 0I **An improved person re-identification method** [12923-46]
- 12923 0J **Artificial intelligence-based intelligent elderly care system** [12923-88]
- 12923 0K **A new EEG emotion recognition method based on channel space attention** [12923-94]
- 12923 0L **Simulation study on energy recovery system of heavy electric forklift** [12923-34]
- 12923 0M **Vehicle interior emotion recognition based on attention mechanism and improved ResNet** [12923-83]
- 12923 0N **Application of multimodal speech recognition based on deep neural networks in interpretation teaching** [12923-89]
- 12923 0O **Research on intelligent assembly experimental teaching platform based on stereo model stacking algorithm** [12923-6]
- 12923 0P **Multi-agent-based emergency supplies dispatch** [12923-45]
- 12923 0Q **Passengers' waiting position selection model of subway platform based on user equilibrium** [12923-68]
- 12923 0R **Research on digital twin testing theory and technology for intelligent connected vehicle** [12923-103]
- 12923 0S **An automatic diagnosis method for bearing failure of general aviation piston engine with deep learning networks** [12923-60]
- 12923 0T **Dense reconstruction of substation room with LSD SLAM** [12923-66]
- 12923 0U **Research on automatic 3D modeling of street lamps based on 3DMax** [12923-48]
- 12923 0V **Research on the application of artificial intelligence in the field of information security** [12923-9]
- 12923 0W **Combining character information and contextual feature for conversational humor recognition** [12923-15]

VIRTUAL REALITY APPLICATION AND DEPTH DETECTION

- 12923 0X **Optimization of planning design for one-way station-based hybrid fleet carsharing systems considering vehicle relocation** [12923-12]
- 12923 0Y **Background and foreground attention maps for small object detection** [12923-30]
- 12923 0Z **Attention-based bidirectional long short-term memory for urban traffic prediction using multivariate data** [12923-74]

- 12923 10 **OD prediction of urban rail transit passenger flow based on passenger flow trend characteristics** [12923-22]
- 12923 11 **Structured Fourier contour embedding for arbitrary-shaped slender text detection** [12923-90]
- 12923 12 **Logistics demand forecasting method based on deep learning** [12923-82]
- 12923 13 **Research on passenger flow forecast of urban rail transit based on time-space correlation analysis** [12923-19]
- 12923 14 **The application of NARX neural network model based on wavelet analysis for tide level prediction** [12923-38]
- 12923 15 **Research on color image encryption scheme based on high-dimensional chaotic system and DNA computing** [12923-37]
- 12923 16 **A review of the application and development of virtual reality technology in system development** [12923-97]
- 12923 17 **A new RoBERTa-based criminal case recommendation method** [12923-29]
- 12923 18 **Introducing test theory to deep neural network testing: reliability, validity, difficulty, and discrimination** [12923-39]
- 12923 19 **GCSTN: traffic flow prediction based on graph convolutional networks and spatiotemporal networks** [12923-2]
- 12923 1A **Lightweight target detection method based on YOLOv5** [12923-43]
- 12923 1B **Research on object detection algorithm in complex scene based on improved YOLOv5** [12923-23]
- 12923 1C **A depth map-based collision detection method in VR environment** [12923-14]
- 12923 1D **Retinal vessel segmentation via deep hierarchical semantic segmentation and closing operation** [12923-79]
- 12923 1E **A design of performance analysis and verification platform for intrusion prevention and dangerous approach alarm system** [12923-26]
- 12923 1F **Target detection based on improved swin transformer and Cascade RCNN** [12923-58]
- 12923 1G **Design and research of distribution training system based on virtual digital technology** [12923-62]
- 12923 1H **Low resolution face image adaptive recognition method based on high order singular value decomposition and DNN model** [12923-67]
- 12923 1I **An encoder-decoder deep model for semantic segmentation of leaf vein patterns** [12923-64]

- 12923 1J **A wearable heart rate monitoring system for the elderly based on self-driven flexible sensors** [12923-52]
- 12923 1K **Performance analysis of improvemental LOD technology under VR headsets** [12923-57]
- 12923 1L **The application of image style conversion network in the design of Zhuang brocade pattern derivation** [12923-102]
- 12923 1M **Intelligent recognition system for citrus plant diseases based on image analysis** [12923-17]
- 12923 1N **Multi-logic interactive model of virtual reality based on digital media** [12923-86]
- 12923 1O **Automatic hot spot edge-detection method for photovoltaic aerial infrared image** [12923-24]
- 12923 1P **Automatic recognition method of wheat lodging image based on ACSNet** [12923-69]
- 12923 1Q **Improved electric bike helmet wearing detection algorithm for YOLOv5s** [12923-16]
- 12923 1R **Aviation emergency rescue virtual training system based on virtual reality** [12923-8]
- 12923 1S **A study on suicidal ideation detection based on domain knowledge and multi-head knowledge attention mechanism** [12923-28]

COMPUTER IMAGING AND VISUALIZATION ANALYSIS

- 12923 1T **Exploring the brain structure-function relationship via simulated data using constant-block PLSC** [12923-42]
- 12923 1U **Exploring brain structure-function relationship using constant-block PLSC via MRI data** [12923-53]
- 12923 1V **Dynamic graph convolution recurrent neural network for traffic flow prediction** [12923-3]
- 12923 1W **Improving the efficiency of split learning based on multi-user and parallel training** [12923-101]
- 12923 1X **Data visualization for designing F2C IoT agricultural system** [12923-76]
- 12923 1Y **A study of multi-intentional interrogative comprehension methods in the field of tourism** [12923-85]
- 12923 1Z **CTC_BERT: a Chinese text correction model with multi-scale semantic feature caption** [12923-77]
- 12923 20 **Research on multilingual sentiment analysis based on N-gram and gating mechanism** [12923-80]
- 12923 21 **Modeling on passenger path selection behavior of metro network considering multiple factors** [12923-20]

- 12923 22 **Research on the improved PBFT consensus algorithm based on credit mechanism** [12923-87]
- 12923 23 **A method for esophageal cancer classification using mutual information feature selection and adversarial samples** [12923-78]
- 12923 24 **Research and development of geographic indication product visualization platform based on WebGIS** [12923-11]
- 12923 25 **Application of radial basis function neural network in optimization of process parameters of cigarette silk making** [12923-49]
- 12923 26 **Image-text fusion sentiment analysis with textual attention** [12923-98]
- 12923 27 **Hydrodynamic prediction of ship including heave and trim** [12923-32]
- 12923 28 **Scanning coherent diffraction imaging using cascaded residual network** [12923-65]
- 12923 29 **High capacity secret embedding strategy for QR codes based on EMD** [12923-7]
- 12923 2A **ROV simulation developed in physics engine** [12923-40]
- 12923 2B **The application of CiteSpace software in document visual analysis and writing** [12923-41]
- 12923 2C **A review of modeling and simulation of equipment based on visualization** [12923-56]
- 12923 2D **Depth completion of transparent objects based on convolutional attention mechanism** [12923-55]
- 12923 2E **A method of line drawing generation and face optimization** [12923-35]
- 12923 2F **Research on the construction method of knowledge graph for programming language** [12923-93]
- 12923 2G **An IGA model for resource allocation in heterogeneous networks for the Internet of Things** [12923-106]
- 12923 2H **Text2SQL model oriented to power grid information retrieval** [12923-5]
- 12923 2I **Contextual copy-paste data augmentation for object detection** [12923-95]
- 12923 2J **Visual analysis of research hotspots and frontiers of smart healthcare** [12923-105]
- 12923 2K **Database security intrusion behavior identification method based on mapping deep learning** [12923-84]
- 12923 2L **Dense mapping of large outdoor scenes based on pseudo-LiDAR** [12923-73]