PROCEEDINGS OF SPIE

International Conference on Electronic Information Engineering and Computer Communication (EIECC 2021)

Zhiyuan Zhu
Fengxin Cen
Editors

17–19 December 2021
Nanchang, China

Organized by
Southwest University (China)
Global Scientific Research Association (China)

Published by
SPIE

Volume 12172

Proceedings of SPIE 0277-786X, V. 12172

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 Electronic Information Engineering and Computer Communication (EIECC 2021)*, edited by Zhiyuan Zhu, Fengxin Cen, Proc. of SPIE 12172, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510653191
ISBN: 9781510653207 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2022 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

ix *Conference Committee*

ELECTRONIC INFORMATION TECHNOLOGY AND ARTIFICIAL INTELLIGENCE APPLICATION

12172 02 **A method of jamming recognition based on multi-domain joint convolutional neural network** [12172-64]

12172 03 **Category attentive graph neural networks for session-based recommendation** [12172-10]

12172 04 **Research on a perceptual system of small unmanned surface vehicle** [12172-53]

12172 05 **Research on privacy protection technology of VANETs based on blockchain** [12172-106]

12172 06 **Microservice: dynamic load balancing strategy based on consistent hashing** [12172-105]

12172 07 **Question answering system based on military knowledge graph** [12172-44]

12172 08 **Research and realization of vehicle simulation on urban road network** [12172-69]

12172 09 **IPFS keyword search based on double-layer index** [12172-63]

12172 0A **ACANet: across-scale context attention network for real-time semantic segmentation** [12172-51]

12172 0B **Urbanization process and fraud crime rate: take J Province as an example** [12172-88]

12172 0C **Text region extraction method for historical Tibetan document based on border detection** [12172-59]

12172 0D **A privacy-preserving target pattern matching scheme for digital health system** [12172-3]

12172 0E **Chinese named entity recognition method based on BERT and fusion attention mechanism** [12172-38]

12172 0F **Dynamic analysis of smart education research based on knowledge graph visualization** [12172-92]

12172 0G **Implementation and evaluation of the ORB-SLAM3 in the underwater environment** [12172-77]

12172 0H **Joint bandwidth allocation, trajectory design and passive beamforming for IRS-equipped UAV aided OFDMA system** [12172-32]

12172 0I **Internet of vehicles data security risks and protection** [12172-26]

12172 0J **Design and application of navigation status monitoring system for unmanned surface vehicle** [12172-62]

12172 0K **Development of MATLAB GUI based on blob analysis for automatic extraction of defects** [12172-9]

12172 0L **Low power and high throughput authenticated encryption chip for radio frequency applications** [12172-2]

12172 0M **Frequency assignment method of HF cognitive network based on combinatorial auction** [12172-70]

12172 0N **A makeup transfer method based on attention generative adversarial networks** [12172-89]

12172 0O **A network attack detection system of OpenStack cloud platform based on Elastic Stack** [12172-17]

12172 0P **A secure three-factor authentication scheme for E-health systems** [12172-24]

12172 0Q **Concrete temperature monitoring system based on embedded** [12172-104]

12172 0R **A study of the emotional information acoustic characteristics of synthetic speech phoneme /ei/** [12172-42]

12172 0S **Research on the impact of artificial intelligence technology on green innovation** [12172-13]

12172 0T **Design of electronic sphygmomanometer based on pulse wave** [12172-20]

COMPUTER ALGORITHMS AND MODEL RECOGNITION PREDICTION APPLICATIONS

12172 0U **Power equipment indicator status detection algorithm based on the improved YOLOv4 and HSV color space** [12172-15]

12172 0V **A multimodal emotion recognition model based on deep neural network with cross-media data feature fusion** [12172-6]

12172 0W **FTCNet: a lightweight model for large-pose face alignment** [12172-19]

12172 0X **Segment-tree based stereo matching algorithm of segmented regions collaborative optimization** [12172-73]

12172 0Y **Auto insurance fraud detection based on Logistic-SVM algorithm** [12172-58]

12172 0Z **Genetic-Cuckoo fusion algorithm** [12172-79]

12172 10 **Electric vehicle charging load forecasting based on federal learning** [12172-56]

12172 11 **Risk prediction of Shill bidding fraud based on support vector machine** [12172-101]

12172 12 **EKF-based fusion algorithm for magnetic nail navigation technology** [12172-11]

12172 13 **Path planning of multi-parcel UAV based on improved simulated annealing algorithm** [12172-55]

12172 14 **Humor detection in edited news headlines: predicting humor ratings for news headlines with atomic change** [12172-57]

12172 15 **Analysis of total factor productivity of power generation enterprises based on data envelopment analysis model** [12172-71]

12172 16 **Optimization and prediction of ERa activity screening of anti-breast cancer candidate based on machine learning algorithm** [12172-83]

12172 17 **Urban micro-renewal of human pet interaction space based on digital modeling** [12172-65]

12172 18 **Steel surface defect detection algorithm combined with attention mechanism** [12172-18]

12172 19 **Intelligent development of mode recognition system based on computer software technology** [12172-47]

12172 1A **E-commerce fraud risk prediction based on RUSBoost algorithm** [12172-86]

12172 1B **Crowd density estimation and warning model in key control areas of large factories based on CNN** [12172-49]

12172 1C **Application of weighted fuzzy C-means algorithm in high resolution range profile target detection** [12172-22]

12172 1D **Research on wireless sensor network optimization based on genetic algorithm** [12172-54]

12172 1E **Research on behavioral modeling method of multifunctional radar based on behavioral science** [12172-87]

12172 1F **Hybridized improvement of the chaotic Harris Hawk optimization algorithm and Aquila Optimizer** [12172-7]

12172 1G **Improved registration algorithm for SAR image based on stable point of PS-InSAR** [12172-14]

12172 1H **Whale optimization algorithm based on hybrid adaptive strategy** [12172-5]

12172 1I **Personal credit risk identification based on boosting-C5.0 algorithm** [12172-102]

12172 1J **Research on a fast method of building procedural modeling** [12172-52]

12172 1K **The translation of shoeprint to barefoot footprint based on SM-GAN** [12172-12]

INTELLIGENT COMMUNICATION TECHNOLOGY AND SIGNAL IMAGE RECOGNITION

12172 1L **Application of image fusion technology in emergency prevention and control** [12172-1]

12172 1M **An enhanced non-contact heart rate measurement in a 24GHz doppler radar system** [12172-74]

12172 1N **Design of connected and autonomous vehicle communication terminal based on 5th generation mobile communication network slicing model** [12172-23]

12172 1O **Design of aircraft formation clustering communication routing protocol based on evolutionary game theory** [12172-33]

12172 1P **Anti-jamming method based on equivalent sampling for UWB pulse train signal** [12172-81]

12172 1Q **Research on the architecture of software-defined network controller based on the space-ground integrated network** [12172-30]

12172 1R **Simulation method of space-based optical observation image based on two-line-elements** [12172-95]

12172 1S **Fault diagnosis method for relay protection channel based on semantic web** [12172-48]

12172 1T **SAR assessment for electromagnetic exposure to mobile phone with different antennas and human postures** [12172-66]

12172 1U **Knowledge graph for different platforms with radar: construction and application** [12172-43]

12172 1V **The design and simulation of digital filter** [12172-80]

12172 1W **A novel 3300V conductivity modulation enhanced IGBT with P-type Schottky contact and partial N-type buried layer** [12172-41]

12172 1X **Image segmentation of Huaniu apple based on pulse coupled neural network and watershed algorithm** [12172-31]

12172 1Y **5G communication technology in over-voltage fault edge computing of distribution grid** [12172-28]

12172 1Z **Communication bandwidth prediction based on low power wide area network in power distribution and utilization of smart grid** [12172-50]

12172 20 **Anti-jamming performance analysis of FDA-MIMO based adaptive beamforming with linear and nonlinear frequency offsets** [12172-45]

12172 21 **Design of real-time image acquisition and display system based on FPGA** [12172-16]

12172 22 **Design of substation power line carrier intelligent air switch based on carrier communication technology** [12172-107]

12172 23 **Evolving convolution neural networks using particle swarm optimization for image classification** [12172-4]

12172 24 **Spectral normalized CycleGAN with application in semi-supervised semantic segmentation of sonar images** [12172-90]

12172 25 **Experimental research on the position control of thermal imager interference spot under laser saturation irradiation** [12172-99]

12172 26 **Cross-view UAV image matching and localization using deep convolution features** [12172-108]

12172 27 **New development on physical layer security in wireless communication** [12172-82]

12172 28 **A new high-voltage diode structure with backside double injection holes (BDIH)** [12172-72]

12172 29 **Minimum dispersion beamforming using modified conjugate gradient method** [12172-100]

12172 2A **Application of deep learning in high-resolution remote sensing image classification** [12172-40]

12172 2B **Comparison of modulate and demodulate methodologies for quantum communication** [12172-96]

12172 2C **Design of multi-layer tri-band antenna based on half-mode technology** [12172-103]

12172 2D **Research on channel transmission and power control technology of unmanned aerial vehicle cellular network** [12172-21]

12172 2E **Distributed resource optimization for multi-user indoor power line communications** [12172-37]

12172 2F **An improved railway signal safety protocol I based on commercial cryptography 4 for metro train control system** [12172-8]