PROCEEDINGS OF SPIE

International Conference on Optics, Electronics, and Communication Engineering (OECE 2024)

Yang Yue *Editor*

26–28 July 2024 Wuhan, China

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

Published by SPIE

Volume 13395

Part One of Two Parts

Proceedings of SPIE 0277-786X, V. 13395

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

International Conference on Optics, Electronics, and Communication Engineering (OECE 2024), edited by Yang Yue, Proc. of SPIE Vol. 13395, 1339501 · © 2024 SPIE · 0277-786X · Published under a Creative Commons Attribution CC-BY 3.0 License · doi: 10.1117/12.3054464

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 Optics, Electronics, and Communication Engineering (OECE 2024), edited by Yang Yue, Proc. of SPIE 13395, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510685437

ISBN: 9781510685444 (electronic)

Published by

SPIE

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

SPIE.org

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

xiii Conference Committee

Part One

OPTICAL ENGINEERING

13395 02	Contrast measure improved by weighted vertical mean difference for small infrared maritime target detection [13395-100]
13395 03	Morphological characteristics modeling and fluid simulation of metal fiber sintered felt based on growth model and Monte-Carlo method [13395-45]
13395 04	Variational method study on the parameter evolution of incoherent dual beams in competitive nonlinear media [13395-5]
13395 05	Application of laser 3D printing technology in rapid prototyping manufacturing [13395-2]
13395 06	Hyperspectral image classification based on coupled dual-channel generative adversarial network [13395-121]
13395 07	High precision attitude estimation algorithm for SINS/CNS integrated navigation with unknown noise characteristics [13395-132]
13395 08	Interactable mobile computing framework for augmented reality glasses [13395-143]
13395 09	Predictive study of uniformity of variable frequency microwave heating based on PSO-SVM [13395-207]
13395 0A	Super-resolution reconstruction of infrared images based on dual attention guidance [13395-202]
13395 OB	Modelling the thermal and mechanical properties of electrodes under calendering process based on discrete element simulation [13395-199]
13395 OC	Heavy ion induce single event transient effects in SOI transistor [13395-226]
13395 OD	Extrapolation optimization time power conformable fractional derivative non-linear grey Bernoulli model and its application [13395-48]
13395 OE	Explore the role of sensors and machine learning in the context of mechanics in improving the indeer positioning capabilities of educational assisted robots. [13395-233]

MECHANICAL AND AUTOMATION CONTROL

13395 OF	Simulation design and analysis of angle between outer and inner wings of flapping wing robot [13395-119]
13395 0G	Space dual-arm compliant capture control technology based on force/contact fusion [13395-43]
13395 OH	Research on fire and explosion-proof elevator design based on RAHP-QFD [13395-218]
13395 01	Evolution characteristics of the spatiotemporal pattern of alarm of electric power transmission line monitoring system [13395-200]
13395 OJ	Dynamics matching calculation and real vehicle verification of a vehicle equipped with AT transmission [13395-198]
13395 OK	Current status and development trends of research on autonomous decision-making methods for unmanned swarms [13395-227]
13395 OL	Research on robust control strategies for diesel engines based on H^{∞} theory [13395-232]
13395 OM	Research and control of material completeness rate in coal machinery equipment overhaul [13395-237]
13395 ON	Experimental analysis of bionic rotary tillage broken stubble with universal blade [13395-236]
13395 00	Fault diagnosis of low-speed heavy-duty rolling bearings based on acoustic emission and CEEMDAN energy entropy [13395-54]
13395 OP	Research on the mechanical state detection technology of high voltage isolation switch based on torque and angle $$ [13395-224]
13395 0Q	ZVS control strategy for four-switch buck-boost converter based on inductor peak current minimization method [13395-104]
13395 OR	Design of marine garbage cleaning robot based on IoT and AHRS [13395-60]
13395 OS	Analysis and research on optimizing the design theory of small and medium-sized circular shafts using computer expert systems [13395-89]
13395 OT	Optimization of parameters of fuzzy PID controller using grey wolf algorithm [13395-122]
13395 OU	Adaptive trajectory tracking control of space manipulator with fast fixed-time convergence [13395-212]
13395 OV	Analysis of bearing capacity of aluminum alloy box girder after welding [13395-190]

13395 OW	Research on real-scene 3D reconstruction algorithm combining NeRF with UAVs [13395-29]
13395 OX	Robot navigation and grasping for household scenarios: a point cloud-centric approach [13395-169]
13395 OY	Noise test system of auto alternator based on LabVIEW [13395-182]
13395 OZ	A kind of intelligent access control system based on STM32 microcontroller unit [13395-213]
13395 10	Vibration analysis and simulation of composite fan blades with various laminate configurations [13395-203]
13395 11	Constellation-level autonomous mission planning technology for distributed networking [13395-94]
13395 12	Embedded design of intelligent vision in sports performance accuracy verification devices [13395-23]
13395 13	Research on UAV formation optimization based on emergence effect of swarm intelligence [13395-97]
13395 14	Design of the following car based on FreeRTOS and UWB [13395-12]
13395 15	Car rental system based on spring boot [13395-102]
13395 16	Multimodal fusion framework: comprehensive information utilization and performance optimization in driver style classification [13395-46]
13395 17	Improving traffic speed prediction by embedding road dependence in the learning matrix of CNN [13395-51]
13395 18	Application of unmanned aerial vehicle in power grid inspection [13395-242]
13395 19	Two-stage stochastic programming research of UAVCN based on improved genetic algorithm under earthquake disaster [13395-141]
13395 1A	Research on the relationship between new energy vehicles and dual carbon based on multiple regression [13395-205]
13395 1B	Fusion method aiming at environmental perception of autonomous vehicle based on visual scheme [13395-134]
13395 1C	An innovative study on a smart wheelchair with the function of health monitoring [13395-210]
13395 1D	Research on product quality control based on multiagent modeling [13395-230]
13395 1F	Modeling and analysis of vehicle driving dynamics based on Simulink [13395-201]

13395 1F	Research and application of key technologies for intelligent manufacturing of steel structures for bridges and tunnels in the Shenzhen-Zhongshan link [13395-44]
13395 1G	A bio-inspired design of real-time control learning algorithm in model-free drone manipulation [13395-222]
13395 1H	Research on unmanned aerial vehicle power inspection technology based on YOLOV3 [13395-241]
	ELECTRONIC AND COMPUTER ENGINEERING
13395 11	MobileViTv2-ResUNet: U-shaped transformer architecture for precise retinal vessel segmentation [13395-13]
13395 1J	ViT lightweight training at IoT edge based on transfer learning [13395-14]
13395 1K	Self-attention model based on multiscale convolution [13395-16]
13395 1L	WebGL-based virtual reality technology construction and optimization [13395-19]
13395 1M	Navigational safety evaluation of cautionary area based on improved topological cloud model [13395-20]
13395 1N	New constraint-based Bayesian network structure learning method for continuous variables [13395-25]
13395 10	Research on multimodal transport path optimisation with time windows under uncertainty conditions [13395-27]
13395 1P	Meta-transfer learning-based multiclassification algorithm for breast cancer [13395-28]
13395 1Q	Research on surface microdefect detection method for metal parts based on YOLOv5 [13395-31]
13395 1R	MTL-DEUnet: meta-transfer learning enhanced dual encoder U-Net for accurate cell nucleus segmentation [13395-32]
13395 18	MSF-TransUNet: transformer multiscale fusion on U-Net for gastric cancer pathological image segmentation [13395-37]
13395 1T	CSDS-ResNet: cost-sensitive dual-stream residual networks for multiclass imbalanced data classification [13395-38]

13395 1U Research on improving DeepLabv3+ lightweight network for detection of train tarpaulin

13395 1V Particle swarm optimization based on adaptive learning strategy [13395-39]

damage [13395-103]

13395 1W	Particle swarm optimization algorithm-based siting and design of fishing vessels concentrating on crossing the precautionary area [13395-41]
13395 1X	Semi-analytical and numerical models to investigate the regulation of shock response spectrum generating in plates [13395-211]
13395 1Y	Research on improved MobileFaceNet facial recognition algorithm [13395-7]
13395 1Z	Global context-aware and attention mechanism method for small-scale pedestrian detection [13395-162]
13395 20	Cascade width learning-based fatigue detection method [13395-8]
13395 21	Learning orientation detection system and its application to RGB images [13395-10]
13395 22	Design of emergency materials dispatching system based on banker algorithm [13395-214]
13395 23	Application of 3D digital core technology in live fault detection [13395-206]
13395 24	Design of a college student electronic homework plagiarism detection system based on SimHash algorithm and document feature similarity analysis [13395-195]
13395 25	Construction of multimodal interaction mechanism of Chinese medicine empowered by artificial intelligence in global communication [13395-217]
13395 26	Simulation analysis of power electronic converter based on PWM [13395-189]
13395 27	Research and application of real-time human posture recognition technology based on TensorFlow.js and CNN model [13395-221]
13395 28	Key parameter design of articulated dump forklift [13395-245]
13395 29	Improved spatio-temporal transform network model introducing volatility evaluation [13395-58]
13395 2A	Method of camouflage target filtering [13395-42]
13395 2B	YOLO-Ti: an efficient object detection approach for tiny facial markers [13395-73]
13395 2C	Study on the complex dynamics and chaos control for Bertrand duopoly game models with emission charges [13395-75]
13395 2D	Research on quality evaluation of 3D reconstruction model empowered by AI algorithm [13395-18]

13395 2E	Research on optimal vehicle path algorithm based on improved ant colony algorithm [13395-79]
13395 2F	Navigation RF front-end group delay fluctuation measurement method [13395-80]
13395 2G	Research on robustness of federated learning based on pruning optimization [13395-81]
Part Two	
13395 2H	Numerical solution of Volterra integral equation with piecewise intervals by iterative method [13395-87]
13395 21	Research on bridge disease recognition algorithm based on SAM and YOLOv8 [13395-62]
13395 2J	Heart failure prediction: a comparative analysis of machine learning algorithms [13395-88]
13395 2K	ISMU-Net: insulator image segmentation with mamba-based U-Net [13395-152]
13395 2L	Color image encryption algorithm based on compressed sensing and DNA [13395-59]
13395 2M	Algorithm for detecting sea sky-line based on watershed segmentation [13395-108]
13395 2N	Enhanced dynamic and static graph attention network for power time series prediction [13395-112]
13395 20	Geographic entity relationship extraction model based on improved CasRel [13395-120]
13395 2P	Horizontal scale study of low-level wind shear based on F-factor [13395-127]
13395 2Q	Comparative detection of rock cracks based on two convolutional neural networks [13395-128]
13395 2R	Short-term power load forecasting based on improved back propagation neural network [13395-1]
13395 2\$	Application of concrete compression constitutive model based on energy damage [13395-71]
13395 2T	High-speed dry hobbing geometry parameterization and hobbing simulation [13395-186]
13395 2U	DBayC: pose estimation and behavior prediction based on dynamic Bayesian CNN [13395-135]

13395 2V Substation bird detection based on feature selection and attention mechanism [13395-137]

3395 2W	Research on numerical simulation technology of small and medium-sized polygonal approximate circular diaphragm wall [13395-92]
13395 2X	Multi-scale cross-fusion attention for few-shot intestinal polyp image semantic segmentation [13395-4]
13395 2Y	Optimization design of overall assembly tolerance for ships based on the Monte-Carlo method [13395-147]
13395 2Z	Research on deep reinforcement learning-based power equipment event extraction technique [13395-63]
13395 30	Failure analysis and improvement of tact switch in smart meter after accelerated life testing (ALT) [13395-150]
13395 31	A coarse-to-fine framework with ordinal regression for facial age estimation [13395-153]
13395 32	Research on water supply network pressure prediction using PSO-BP neural network algorithm [13395-156]
13395 33	Image acquisition module based on FPGA [13395-163]
13395 34	Complex temporal data model and extraction technology of multispatial database based on clustering algorithm [13395-161]
13395 35	Application research on BP-ANN models of lightning prediction with spatio-temporal characteristics [13395-170]
13395 36	Research on the equivalence principle and module design of erasure code based on multitenants [13395-188]
13395 37	Self-supervised learning based on spatial scale learning and category prediction [13395-193]
13395 38	Uniqueness conditions for 1D signal reconstruction from power spectrum with additional data term information [13395-52]
13395 39	Automatic recognition method of abnormal behavior in athletes [13395-34]
13395 3A	FATO-SQL: a comprehensive framework for high-performance Text-to-SQL task [13395-166]
13395 3B	Uniqueness condition for 1D signal reconstruction from power spectrum with related interference signal information [13395-53]
13395 3C	Gene association analysis for Bayesian network integrated classification [13395-228]
13395 3D	Spatiotemporal dynamics and center of gravity shifts in China's cold chain logistics infrastructure [13395-234]

13395 3E	Research on winning rate prediction of e-sport League of Legends based on machine learning [13395-109]
13395 3F	Analysis and research on network influencing factors based on 5G rate calculation [13395-240]
13395 3G	Heat-based algorithm for identifying hot and cold data in database [13395-133]
13395 3H	Construction of target track quality grading system [13395-238]
13395 31	Design of an energy management system based on digital twins [13395-84]
13395 3J	Enhancing gesture recognition systems: integrating deep learning with advanced flexible sensing technologies [13395-47]
13395 3K	Supply forecasting method of rural water plants based on long short-term memory network [13395-49]
13395 3L	Design and implementation of a new energy storage information universal management platform [13395-55]
13395 3M	Research on R-wave localization algorithm based on improved Pan-Thompkins [13395-139]
13395 3N	Empirical study on standardization in Haidian district, Beijing based on machine splitting and positioning assignment technology [13395-76]
13395 30	Research on monitoring technology of underground diaphragm wall construction of small and medium-sized circular shafts based on artificial intelligence [13395-196]
13395 3P	Artificial intelligence empowered optimization of tumor single-cell sequencing data features and clinical implications [13395-24]
13395 3Q	Research on user scale requirements based on 5G core network resource pool calculation [13395-243]
13395 3R	Multilabel semantic segmentation algorithm for stroke extraction in calligraphy teaching [13395-40]
13395 3\$	Simulation study of 3D SVT machine table with topology optimisation by variable density method $[13395-239]$
13395 3T	LeNet-5 handwritten digit recognition based on deep learning [13395-131]
13395 3U	Optimized image classification techniques: comparing orthogonal basis and logistic regression with entropy and PCA in cat and dog image recognition [13395-244]
13395 3V	Research on optimal water level algorithm based on the Great Lakes [13395-165]

13395 3W	Method for path selection of harmful chemicals transportation on a grid network [13395-99]
13395 3X	Knowledge graph construction method for business process instructed by prompts [13395-98]
13395 3Y	Method for background replacement of certification photos [13395-118]
13395 3Z	Application of generative artificial intelligence in the petroleum field: automatic generation of seismic acquisition design reports [13395-33]
13395 40	Portrait positioning and demand analysis of bridge fusion target population based on internet big data [13395-179]
	COMMUNICATION ENGINEERING
13395 41	Email phishing attack detection based on BERT transformer model [13395-114]
13395 42	Novel SURF image mosaic method based on wavelet transform [13395-194]
13395 43	Graph convolution-based feature disentanglement for visible-infrared person re-identification [13395-123]
13395 44	Research on structural design of digital coding meta surfaces based on FDTD and genetic optimization algorithm [13395-35]
13395 45	Multilevel guided collaborative task scheduling algorithm of satellite mission aiming at moving target observation [13395-192]
13395 46	Simplified active noise control system with decorrelation reference signals [13395-3]
13395 47	Multimodal water body extraction network based on remote sensing satellite images and digital surface model [13395-9]
13395 48	Multiobjective optimization for task allocation in urban street battle [13395-107]
13395 49	Channel modeling with one-stage conditional generative adversarial network for fiber optic communication system [13395-160]
13395 4A	Cooperative transmission scheme based on mobility clustering for popular content distribution [13395-117]
13395 4B	Intelligent detection method for travel document watermarks based on Faster RCNN [13395-164]
13395 4C	Characteristics of WeChat formation images for forensic applications [13395-15]

13395 4D	Intelligent transformation design of ordinary door lock device based on WIFI communication technology [13395-21]
13395 4E	Research on cloud edge collaboration technology based on root cause analysis and predictive maintenance of communication station [13395-22]
13395 4F	General model of standard knowledge representation and method of knowledge extraction: taking the standards in the field of electric power operation and maintenance as an example [13395-68]
13395 4G	A similarity-based method for evaluating single-stroke regions [13395-86]
13395 4H	Keywords extraction algorithm based on attention mechanism of BERT model [13395-95]
13395 41	Forensic taken time authentication of mobile phone photos [13395-17]
13395 4J	Signal optimization design method for integration of communication and radar based on OTFS [13395-96]
13395 4K	Research on data consistency method based on distributed network architecture [13395-85]
13395 4L	Efficient data security sharing model with integrating of CP-ABE encryption and blockchain [13395-113]
13395 4M	Single-cell RNA-seq data feature extraction using dual-depth model [13395-124]
13395 4N	Optimized design of QPSK-OFDM-based audio transmission system [13395-130]
13395 40	Cognitive pitfalls of LLMs: a system for generating adversarial samples based on cognitive biases [13395-138]
13395 4P	Survey on edge computing and its evolution [13395-154]
13395 4Q	Overview of spoofing interference detection in satellite navigation [13395-6]

Conference Committee

Conference Chairs

Yuriy S. Shmaliy, Universidad de Guanajuato (Mexico)
Ephraim Suhir, Portland State University and University of California at Los Angeles (United States)
Adrian Ioinovici, Shanghai University of Electrical Power (China)
Diaa A. M. Khalil, Ain Shams University (Egypt)
Yang Yue, Xi'an Jiaotong University (China)
Shunli Wang, Smart Energy Storage Institute (China)

Yang Zhang, Smart Energy Storage Institute (China)
Yang Zhang, Nanchang Institute of Technology (China)
Changbo Cheng, Hubei Zhongke Institute of Geology and
Environment Technology (China)

Technical Program Committee

Abdel Ghani Aissaoui, University of Bechar (Algeria)

Ahmad Fakharian, Islamic Azad University (Iran, Islamic Republic of)

Alessandro Bosisio, University of Pavia (Italy)

Alessandro Lo Schiavo, Università degli Studi della Campania Luigi Vanvitelli (Italy)

Anabela Moreira Bernardino, Polytechnic Institute of Leiria (Portugal)

Antonino Galletta, University of Messina (Italy)

Asif Ali Laghari, Sindh Madressatul Islam University (Pakistan)

Cheng Siong Chin, Newcastle University in Singapore (Singapore)

Elisabeta Mihaela Ciortea, University of Alba Iulia (Romania)

Hocine Bensalah, University of Medea (Algeria)

Kasturi Vasudevan, Indian Institute of Technology, Kanpur (India)

Jun Lu, Northeastern University (China)

Mario O. Oliveira, National University of Misiones (Argentina)

Nur Ezlin Zamri, Universiti Sains Malaysia (Malaysia)

R. Sujatha, Vellore Institute of Technology (India)

Salabat Khan, Shenzhen University (China)

Shruthi Koratagere Anantha Kumar, University of Strathclyde (United Kinadom)

Sunny Joseph Kalayathanka, Jyothi Engineering College (India)

Ufana Riaz, North Carolina Central University (India)

Wan Maisarah Mukhtar, Universiti Sains Islam Malaysia (Malaysia)

Wenbing Zhao, Cleveland State University (United States)

Zairi Ismael Rizman, Universiti Teknologi MARA (Malaysia)