PROCEEDINGS OF SPIE

The International Conference Optoelectronic Information and Optical Engineering (OIOE2024)

Yang Yue
Lu Leng
Editors

18–20 October 2024
Wuhan, China

Organized by
American Natural Science and Technology (United States)

Sponsored by
IEEE ComSoc France Chapter (France)

Published by
SPIE

Volume 13513

Part One of Two Parts

Proceedings of SPIE 0277-786X, V. 13513

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 *The International Conference Optoelectronic Information and Optical Engineering (OIOE2024)*, edited by Yang Yue, Lu Leng, Proc. of SPIE 13513, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510688193
ISBN: 9781510688209 (electronic)

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time)
SPIE.org
Copyright © 2025 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

xiii *Conference Committee*

Part One

THE INTERNATIONAL CONFERENCE OPTOELECTRONIC INFORMATION AND OPTICAL ENGINEERING (OIOE2024)

13513 02 **Robust image watermarking algorithm based on residual neural networks** [13513-3]

13513 03 **Computation-driven design: dielectric loss mechanism and performance optimization of epoxy/anhydride curing system** [13513-4]

13513 04 **Light pollution risk assessment and intervention strategies: a comprehensive approach** [13513-6]

13513 05 **Research on knowledge graph construction and intelligent assisted decision-making of power grid dispatching** [13513-7]

13513 06 **Adsorption properties of $TiVCT_X$/cellulose composite aerogel** [13513-8]

13513 07 **Research on high voltage ride through of centralized photovoltaic inverters under unbalanced sudden voltage rise in the power grid** [13513-10]

13513 08 **Detection method and application of performance indicators of fiber optic inertial navigation system** [13513-11]

13513 09 **Research on seismic performance of anti-buckling graded yield metal damper** [13513-12]

13513 0A **Brief discussion of computer simulation analysis for acoustic parameters in radio and television media building** [13513-13]

13513 0B **Performance of chirp spread spectrum in the multipath channel** [13513-14]

13513 0C **Investigation of temperature drift compensation technology for actuator shaft displacement sensing system** [13513-15]

13513 0D **Design and implementation of a mobile infant care monitoring system based on virtual simulation technology of computer service programs** [13513-16]

13513 0E **Key technology of reactive current sensor in three-phase circuit with hall effect** [13513-17]

13513 0F **Study on the influence of particle size distribution and content of oxidant on mechanical properties of high-energy propellant** [13513-18]

13513 0G **Research on the current status of remote sensing image land classification information retrieval technology based on deep learning** [13513-19]

13513 0H **Study on hydrodynamic resistance of nano-composite cement-based grouting materials** [13513-20]

13513 0I **Analysis of electromagnetic and mechanical characteristics of typical high impedance transformers under excitation inrush current conditions** [13513-22]

13513 0J **An improved frog swarm neural network algorithm based on hyperspace dimensional chaos mapping** [13513-23]

13513 0K **Cooling design of a three-dimensional cascade extensible digital sub-array** [13513-24]

13513 0L **Study on the performance of coke powder used in pipeline transportation of slurry** [13513-25]

13513 0M **Revisiting the efficacy of signal decomposition in AI-based time series prediction** [13513-27]

13513 0N **Quantum image encryption algorithm based on generalized Arnold transform and Lorenz chaotic systems** [13513-28]

13513 0O **A compact airborne co-aperture cavity-backed spiral antenna design** [13513-29]

13513 0P **Automatic detection technology and application of high-performance Stokes-Mueller imaging polarimeter** [13513-31]

13513 0Q **Classification of skin cancer from dermatological image by multimodal method** [13513-33]

13513 0R **A novel membrane system for carbon capture and conversion** [13513-34]

13513 0S **Preparation of $Ti_3C_2T_x$ MXene/PVA composite films for gas and humidity sensing applications** [13513-35]

13513 0T **Research on art style rendering system based on deep learning** [13513-37]

13513 0U **Discussion on the application of blockchain technology in intelligent communication and prevention control** [13513-38]

13513 0V **A fashion image retrieval with hybrid features** [13513-41]

13513 0W **Analysis of the laser welding technology scheme for the lock bottom structure of a titanium alloy aerospace pressure vessel** [13513-43]

13513 0X **Design of heat insulation mechanism for ultra-low temperature liquid level detection** [13513-44]

13513 0Y **Bi-directional DC-DC converter with isolation for electric vehicle system applications** [13513-45]

13513 0Z **CO_2 diffusion to nanofluid over a wide range of temperatures and pressures: a molecular dynamics study** [13513-47]

13513 10 **Research on the mechanism of enterprise performance growth based on neural network** [13513-48]

13513 11 **Research on coal mine safety management based on improved particle swarm optimization support vector machine** [13513-49]

13513 12 **Numerical simulation of multiphase flow and particle movement in rare earth electrolytic cell** [13513-50]

13513 13 **Quantitative analysis of the emission reduction potential of information and communication technology on agriculture** [13513-51]

13513 14 **A survey on consensus algorithms for distributed wireless networks** [13513-52]

13513 15 **Research on video image tracking method based on kernel density estimation** [13513-53]

13513 16 **Optimal design of the heliostat field on output thermal power** [13513-55]

13513 17 **Sub-micron precision enhancement of chromatic confocal sensors based on robust centroid algorithms** [13513-56]

13513 18 **Self-organizing maps-based feature extraction methods for HRRP recognition** [13513-57]

13513 19 **Research progress on the irradiation effect of silicon carbide devices** [13513-58]

13513 1A **Research on macroeconomic intelligent decision system based on data mining** [13513-59]

13513 1B **Research on fast identification method of tunnel cable state based on sparse online hybrid Gaussian multi-classification algorithm** [13513-61]

13513 1C **A graduated nonconvex ADMM reconstruction method for diffuse optical tomography with nonsmooth and nonconvex regularization** [13513-62]

13513 1D **Research on improving the delivery time of southern Xinjiang express delivery based on artificial bee colony algorithm** [13513-63]

13513 1E **Intelligent research and judgment system for power grid outage fault based on abnormal signal situation perception** [13513-64]

13513 1F **Temporal measurement of high repetition rate frequency combs down to 3-optical-cycles** [13513-66]

13513 1G **Research progress on forage crop growth monitoring by remote sensing** [13513-67]

13513 1H **Analysis of the spatio-temporal distribution characteristics of short-term intense precipitation in Guangzhou city based on automatic weather stations** [13513-68]

13513 1I **Effect of resin matrix selection on the bending properties of aramid fiber reinforced composites** [13513-69]

13513 1J **The workpiece processing monitoring system based on Mitsubishi PLC and MCGS** [13513-70]

13513 1K **Study on properties of biomass solid waste decorative materials** [13513-71]

13513 1L **Synthesis, photocatalytic activity of nanosized ZnO and Ag/ZnO heterostructure** [13513-72]

13513 1M **The falling impact analysis of payload cabin carried by aerostat in near space** [13513-73]

13513 1N **Finite element analysis and experimental verification of pure titanium spherical metal diaphragm** [13513-75]

13513 1O **A double-layer capacitive micromechanical ultrasonic transducer** [13513-76]

13513 1P **Cracking analysis of the TC4 aerospace pressure vessel electron beam weld** [13513-77]

13513 1Q **Resilience evaluation method for compressor stations based on Markov processes** [13513-79]

13513 1R **Research on tennis industry supervision and management system based on Web Services** [13513-80]

13513 1S **A computational analysis of reversal behaviors of a spacecraft propellant tank with titanium diaphragm** [13513-81]

13513 1T **Sustainable procurement analysis and visualization of procurement orders from various provinces** [13513-82]

13513 1U **Design and electromagnetic simulation of axial-flux hybrid-excitation motor for electric ship propulsion** [13513-83]

13513 1V **Mechanism for superior combination of strength and plasticity in a spring steel with low final rolling temperature** [13513-85]

13513 1W **Adaptive sample selection with joint loss for medical image classification under label noise** [13513-86]

13513 1X **Research on the energy level promotion-oriented construction of 4D window system in electric power enterprises** [13513-87]

13513 1Y **Study on optimization of rural express trunk transportation in Guizhou under the background of internet + efficient logistics** [13513-89]

13513 1Z **A waveform design method of dense false target jamming suppression** [13513-90]

13513 20 **Differential protection for distribution grids based on dual compressed sensing theory** [13513-91]

13513 21 **Modulation of single ultrafast plasmonic vortex and vortex arrays** [13513-93]

13513 22 **Design of reliability test for nerve electrode wires of deep brain stimulator** [13513-94]

13513 23 **Deep reinforcement learning of energy management strategy for aging fuel cell power systems** [13513-95]

13513 24 **Optimization design of the RO PUF temperature reliability based on MOSFET temperature characteristics** [13513-97]

13513 25 **Quantum dense coding with N-participants in N dimensions** [13513-99]

13513 26 **DZSOC algorithm for LiFePO4 batteries** [13513-100]

13513 27 **Study on hydrogen embrittlement susceptibility of 20# pipeline steel welded joint by hydrogen-doped tensile test** [13513-101]

13513 28 **Research on cost and benefit assessment of deep-sea wind power coordinate with multiple stakeholders to participate in electricity market** [13513-102]

13513 29 **RRT* path planning method for mobile robot based on particle swarm optimization and rotation angle constraint** [13513-103]

13513 2A **The research and practice of ARP 4754A process assurance method in civil aircraft development** [13513-104]

13513 2B **An improved DeeplabV3+ tile image positioning method** [13513-105]

13513 2C **Sparse frequency waveform design under Riemannian manifold constraint** [13513-106]

13513 2D **Multi-sensor detection coalition solving based on improved whale algorithm** [13513-107]

13513 2E **Security analysis of unmanned aerial vehicle avionics system based on STPA: considering software working characteristics** [13513-108]

13513 2F **Research on the optimal allocation of charging facilities in inland river ports considering the charging demand of electric ships** [13513-109]

Part Two

13513 2G **Application of engineering safety system based on 5G+ digital twin in reservoir management** [13513-110]

13513 2H **A flaring planar dipole array antenna** [13513-111]

13513 2I **Phosphorylated MCM-22 supported CeO_2-ZrO_2 nanosphere catalyst with strong anti-$PbCl_2$ ability for NH_3-SCR** [13513-112]

13513 2J **Research on two-party PSI protocol in the unbalanced scenario** [13513-113]

13513 2K **Effect of water environment on preparation of polypyrrole/carbon cloth composite electrode by vapour phase polymerization** [13513-114]

13513 2L **Research on photovoltaic array MPPT based on IPSO-IP&O hybrid algorithm** [13513-115]

13513 2M **Symplectic enumeration reduction algorithm for lattice-based post-quantum cryptography NTRU** [13513-116]

13513 2N **Recent process of bio-memristors** [13513-117]

13513 2O **The design of spectrally-constrained sequences with periodic zero-correlation zone** [13513-119]

13513 2P **Study on comprehensive evaluation of tunnel route scheme based on GIS** [13513-120]

13513 2Q **Task order filing generation algorithm based on multidimensional association rules and similarity matching** [13513-122]

13513 2R **Estimation of LOC parameters based on Kalman filtering** [13513-123]

13513 2S **A survey of learning-based no-reference image quality assessment** [13513-124]

13513 2T **Impact of ambient temperature on electrothermal characteristics of gate-all-around nanosheet FETs** [13513-125]

13513 2U **A research on fast acquisition technology of spatio-temporal data of railway infrastructure based on measurable real image** [13513-127]

13513 2V **Research on the application of artificial intelligence in green building design optimization** [13513-128]

13513 2W **A feature-aware transformer approach for enhanced maritime trajectory prediction** [13513-129]

13513 2X **Modulation recognition based on convolutional neural network and image coding techniques** [13513-131]

13513 2Y **Practice analysis of collaborative security application of power big data** [13513-135]

13513 2Z **A post-arc current measurement system based on antiparallel diodes and its performance research** [13513-136]

13513 30 **Research on machine vision and sensor monitoring technology for urban landscape irrigation systems** [13513-138]

13513 31 **Research on drug relocation methods based on network pharmacology** [13513-141]

13513 32 **A new way of (decentralized) identity authentication and continuous authentication following X3DH framework** [13513-142]

13513 33 **A 3D statistical tolerance analysis method based on Jacobian-Torsor model** [13513-143]

13513 34 **Spectral-spatial attention transformer network for hyperspectral image classification** [13513-144]

13513 35 **Construction of the optimization model of imaging magnification of bifocal glass lens** [13513-146]

13513 36 **Optimization of single-point incremental forming parameters for hydraulic expansion based on Taguchi method** [13513-147]

13513 37 **Optimization of imaging magnification for presbyopia glass lens using Taguchi-principal component analysis** [13513-148]

13513 38 **Image harmonization algorithm based on improved BargainNet** [13513-149]

13513 39 **Research on the application of Taguchi-PCA to the chromatic aberration selection of optics additional glass lens** [13513-150]

13513 3A **Application of visual perception and recognition technology of intelligent inspection robots in Guanyinyan Hydropower Station** [13513-154]

13513 3B **Facial recognition for surveillance videos based on RetinaFace and MobileFaceNet** [13513-155]

13513 3C **Ranging research on Telematics based on Mask R-CNN dual eye stereo vision ranging algorithm** [13513-156]

13513 3D **Research and application of underwater wireless optical communication channel characteristics based on digital twin** [13513-157]

13513 3E **Avionics system interface and image automation testing platform** [13513-158]

13513 3F **Application of association rule mining in Chinese part-of-speech data** [13513-159]

13513 3G **Implementation of digital twin modeling for valve side bushing based on on-site operational data and model-driven concept** [13513-160]

13513 3H **Research on anti-replay attack mechanism of intelligent connected vehicles based on hashing chain and V2X communication** [13513-161]

13513 3I **A new generation of visual combat command system based on emergency map** [13513-162]

13513 3J **Prediction of interior noise in suburban train based on statistical energy analysis (SEA)** [13513-163]

13513 3K **Simulation research on anti-drone effectiveness of artillery equipment** [13513-166]

13513 3L **The influence of modeling accuracy of spatial harmonic reducers on fatigue life analysis** [13513-167]

13513 3M **Evaluation of UAV power supply scheme based on wireless charging technology** [13513-168]

13513 3N **Design and research of integrated safety early warning system of super tall building based on random forest model** [13513-169]

13513 3O **Research on analysis and optimization mathematical model of 356 day charge and discharge data of user side energy storage based on least squares function fitting** [13513-170]

13513 3P **Phase compensation technology of modulating retroreflector free-space optical link** [13513-172]

13513 3Q **Performance evaluation of modulating retroreflector free-space optical communication using coherent detection** [13513-173]

13513 3R **Analysis of typical independent energy storage power station operation data** [13513-174]

13513 3S **Application of high-precision scene perception technology in mining material transportation** [13513-175]

13513 3T **Lanczos bidiagonalization algorithm for 2D face recognition** [13513-176]

13513 3U **Improved drainage pipe defect detection algorithm based on YOLOv8** [13513-177]

13513 3V **Research on starlight simulation technology in near space** [13513-178]

13513 3W **A ship altitude measurement method based on the fusion of camera and LiDAR data** [13513-180]

13513 3X **Temperature field calculation of carbon steel thin film irradiated by multi-pulse femtosecond laser with different width** [13513-181]

13513 3Y **Modeling and faults analysis of distributed rooftop PV grid-connected power generation system** [13513-183]

13513 3Z **A fusion model for predicting distributed photovoltaic power** [13513-184]

13513 40 **Research on fast separation algorithm for overlapping-peak signals of chromatic confocal sensor** [13513-185]

13513 41 **A study of RF front-end dynamic range enhancement on signal analyzer** [13513-186]

13513 42 **Development of a low-cost handheld narrow band multi-spectral imaging system** [13513-187]

13513 43 **Research on optimization of intelligent control systems based on deep reinforcement learning** [13513-188]

13513 44 **Application research of intelligent cable tunnel fire warning and fire protection system** [13513-189]

13513 45 **Design and analysis of optimized power Internet of Things system based on edge computing** [13513-190]

13513 46 **Analysis of wind-induced vibration response of distribution line concrete poles with pedestal piles** [13513-191]

13513 47 **Research on electric power design information platform system design and benefit evaluation** [13513-192]

13513 48 **Optical modulation of nanostructures: application of condensed matter physics in photonic crystal design** [13513-193]

13513 49 **Research on high-resolution remote sensing technology for prospecting iron polymetallic skarn deposits in the Yemaquan area of East Kunlun Mountains** [13513-194]

13513 4A **Identification of burnt rock based on hyperspectral remote sensing data: taking Rujigou Coal Mine in Ningxia as an example** [13513-196]

13513 4B **Research on surface subsidence monitoring of Yanghuopan Coal Mine based on SBAS-InSAR technology** [13513-197]

13513 4C **Research support for key technologies for distributed computing grid investment analysis** [13513-198]

13513 4D **Research on the mechanism of ncRNA in neurogenesis based on deep learning bioinformatics algorithm** [13513-199]

13513 4E **Research on operation status of high voltage combination electrical appliances by combining mechanical vibration signal and SF6 characteristic decomposition gas grey system prediction** [13513-200]

13513 4F **Application of data sensing enhancement technology in trace detection of C5-PFK decomposition gas and its engineering application prediction** [13513-201]

13513 4G **Effect of AVDR on load distribution law of high subsonic stator** [13513-202]

13513 4H **Study on the stability of local over-heating experiment of C5-PFK mixed gas and data analysis based on artificial intelligence** [13513-203]

13513 4I **Topology optimization of heterogeneous satellite networks with variable time slots** [13513-204]

13513 4J **MTR-YOLO multiple transformer-enhanced YOLO for object detection in multimodal remote sensing imagery** [13513-205]

13513 4K **Three-dimensional teaching system and application evaluation based on multimedia perspective** [13513-206]

13513 4L **Simulation of digital circuit fault diagnosis and prediction model based on deep learning** [13513-207]

13513 4M **Fault detection of distributed power distribution network based on grey wolf pack algorithm** [13513-208]

13513 4N **An efficient compaction scheme for LSM-based storage system via lightweight merges** [13513-209]

13513 4O **Research on improving substation operation and maintenance capacity and reducing power cost based on big data** [13513-211]

13513 4P **Construction of Unmanned Aerial Vehicle infrared transmission line inspection system based on optimized flight path algorithm** [13513-212]

13513 4Q **Study on calibration method and uncertainty evaluation of cigarette cutting position detection by microwave technology** [13513-214]