

PROCEEDINGS OF SPIE

***International Conference on Electronic
Information Engineering and Computer
Technology (EIECT 2021)***

Sahil Verma
N. Rajathi
Editors

30 October – 1 November 2021
Kunming, China

Organized by
Kunming University of Science and Technology (China)
Chongqing University (China)
Chongqing University of Technology (China)

Sponsored by
AEIC Academic Exchange Information Center

Published by
SPIE

Volume 12087

Proceedings of SPIE 0277-786X, V. 12087

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 *International Conference on Electronic Information Engineering and Computer Technology (ELECT 2021)*, edited by Sahil Verma, N. Rajathi, Proc. of SPIE 12087, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510650503

ISBN: 9781510650510 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2021 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

ELECTRONIC CIRCUIT CONTROL AND COMMUNICATION NETWORK TECHNOLOGY

12087 02	Simulation study on low frequency load shedding strategy of large power grid considering wind power participation in frequency modulation [12087-36]
12087 03	Design and implementation of rotating speeds modulation for a certain type of engine [12087-12]
12087 04	An efficient high power density output power supply for robots [12087-53]
12087 05	Research on power communication network inspection technology based on robot process automation [12087-45]
12087 06	An end-to-end lipreading network combined with ResNet50 and Bi-GRU [12087-10]
12087 07	Research on 5G network security in smart city [12087-83]
12087 08	Improved design of a wide-band reconfigurable reflectarray unit with loaded SPP structure [12087-46]
12087 09	Review of wind turbine participation in grid FM [12087-40]
12087 0A	Isometric mapping transfer learning based on multi-parameter optimization for infrared water target extraction [12087-17]
12087 0B	Network security data visualization [12087-38]
12087 0C	Research on allocation method based on network slicing technology [12087-60]
12087 0D	Research and application of penetration testing method in industrial control system [12087-43]
12087 0E	Research status and application of magnetic coupling resonant wireless power transmission system [12087-50]
12087 0F	SDN applications and related algorithms in network architecture [12087-61]
12087 0G	Research on low voltage traverse control strategy of DFIG system based on elite ant colony active disturbance rejection [12087-58]
12087 0H	Research on particle filtering signal source localization based on firefly algorithm [12087-28]
12087 0I	A comprehensive study of 5G: evolution, network architecture, challenges, and future directions [12087-81]

- 12087 OJ **Compact high isolation MIMO antenna for 5G mobile terminals** [12087-86]
- 12087 OK **Research on constant beamwidth beamforming for towed linear array** [12087-55]
- 12087 OL **A fault identification device for the electronic board card based on binocular imaging** [12087-72]
- 12087 OM **Specific clustering scenarios and simple algorithm simulation in 5G environment** [12087-15]
- 12087 ON **Multi-spectral fusion network for full-time robust pedestrian detection** [12087-32]
- 12087 OO **Research on operation quality evaluation method of the power communication network** [12087-3]
- 12087 OP **5G application research: integration and future perspectives of blockchain, IoT, and beyond** [12087-85]
- 12087 OQ **Design and implementation of three-phase grid-connected inverter for photovoltaic power generation** [12087-56]
- 12087 OR **Pt-based SERS substrate for detection of R6G and melamine molecules** [12087-75]
- 12087 OS **In-band full-duplex technology: self-interference cancellation** [12087-6]
- 12087 OT **Time synchronization strategy and implementation of LoRa wireless ad hoc network** [12087-57]

ARTIFICIAL INTELLIGENCE ALGORITHMS AND NEURAL NETWORK APPLICATIONS

- 12087 OU **The performance comparison of some methods based on machine learning and deep learning for the web attack detection** [12087-1]
- 12087 OV **Design thinned arrays using genetic algorithm-enhanced density-tapered method** [12087-33]
- 12087 OW **UWB indoor location algorithm based on improved BP neural network** [12087-29]
- 12087 OX **Research on interactive recommendation system based on reinforcement learning** [12087-49]
- 12087 OY **The application of bidirectional gated recurrent unit neural network in biomedical event trigger identification** [12087-66]
- 12087 OZ **Research on dynamic water level recognition algorithm of compartment of applying PP-YOLOv2** [12087-90]
- 12087 IO **Intrusion detection using machine learning methods** [12087-67]

- 12087 11 **A study of phishing website detection based on machine learning methods** [12087-65]
- 12087 12 **The impacts of 5G technology and cloud computing on the gaming accessories industry** [12087-42]
- 12087 13 **A research on V2X autonomous vehicles under 5G technology** [12087-7]
- 12087 14 **Intelligent human detection method based on mixed RGB and infrared images** [12087-69]
- 12087 15 **Research on autonomous collision avoidance system for unmanned ship** [12087-88]
- 12087 16 **Biomedical even trigger identification based on the gated unit neural network and word representation** [12087-68]
- 12087 17 **Design and implementation of automatic test for power management system of unmanned helicopter** [12087-34]
- 12087 18 **Load dynamic balancing algorithm based on software defined wireless network for different access points** [12087-41]
- 12087 19 **An improved binary artificial bee colony algorithm for solving multidimensional knapsack problem** [12087-14]
- 12087 1A **Research on naive Bayes algorithm based on feature weighted** [12087-25]
- 12087 1B **Network intrusion detection via machine learning** [12087-64]
- 12087 1C **Research on convolutional neural network for video classification** [12087-24]
- 12087 1D **Research on collaborative filtering recommendation algorithm based on multi-feature fusion** [12087-21]
- 12087 1E **Malicious email detection via machine learning approaches** [12087-63]
- 12087 1F **Design and implementation of the algorithm for gender and face classification of face images based on convolutional neural network** [12087-52]
- 12087 1G **The comparison of traditional machine learning and deep learning methods for malicious website detection** [12087-62]
- 12087 1H **Design of intelligent container identification system** [12087-87]
- 12087 1I **Research on sensory data-based route planning algorithm for unmanned ships** [12087-89]
- 12087 1J **Application of hybrid shuffled frog leaping algorithm to deterministic flow shop scheduling problem** [12087-18]
- 12087 1K **A mobilenet-SSD target detection algorithm based on attention mechanism** [12087-31]

- 12087 1L **Shilling detection algorithm based on non-negative user embedding matrix factorization** [12087-73]
- 12087 1M **Research on path planning method of wheeled robot based on fuzzy decision** [12087-30]
- 12087 1N **Biomedical event trigger identification based on the bidirectional gated recurrent unit network** [12087-84]

COMPUTER TECHNOLOGY AND MODEL RECOGNITION AND FORECAST

- 12087 1O **Applications of aerospace product test and evaluation in human computer interface design** [12087-8]
- 12087 1P **Emotion classification and language characteristics analysis of "fans community" based on NLP** [12087-23]
- 12087 1Q **Research on energy storage safety monitoring system based on digital twin technology** [12087-70]
- 12087 1R **Application of a vehicular four-tag RFID system in parking and localization** [12087-79]
- 12087 1S **A random code generation method based on syntax tree layering model** [12087-2]
- 12087 1T **Non-intrusive load decomposition method based on CNN-LSTM model** [12087-13]
- 12087 1U **Application of computer simulation technology in sports field** [12087-54]
- 12087 1V **Application research of computer database technology in information management** [12087-80]
- 12087 1W **A recessive active learning method: enhancing the performance of predict models by adjusting the structure of data space** [12087-71]
- 12087 1X **Image compression technology based on picture complexity and blocked graded wavelet transform** [12087-20]
- 12087 1Y **Dual attention-guided residual U-Net for image denoising** [12087-39]
- 12087 1Z **Image captioning using relevance attention and ITEM encoding** [12087-9]
- 12087 20 **An algorithm for instantaneous frequency extraction of incomplete signal based on Viterbi algorithm** [12087-74]
- 12087 21 **Influencing factors identification of cross-border E-commerce capability based on the RBF-DEMATEL model** [12087-59]

- 12087 22 **Certificateless public key encryption with equality test and timestamp-based authorization scheme** [12087-4]
- 12087 23 **The convergence of the MKSOR method for a class of block two-by-two linear systems** [12087-26]
- 12087 24 **A hierarchical bagging-SVM human behavior recognition method** [12087-51]
- 12087 25 **Research on aircraft target recognition in SAR images** [12087-27]
- 12087 26 **Research on decentralized crowdsourcing mechanism based on blockchain** [12087-44]
- 12087 27 **Global Lorentz estimates for hypoelliptic operators with drift on homogeneous group** [12087-47]
- 12087 28 **Automatic verification method of ATC command repetition based on Siamese network** [12087-78]
- 12087 29 **Object detection for helmet wearing situation during the process of construction** [12087-11]
- 12087 2A **Research on real-time video key frame extraction technology based on clustering** [12087-48]
- 12087 2B **Sortie resolution method of radon ambiguity transform based on golden section iteration** [12087-5]