PROCEEDINGS OF SPIE

International Conference on Cloud Computing, Internet of Things, and Computer Applications (CICA 2022)

Warwick Powell
Amr Tolba
Editors

22–24 April 2022
Luoyang, China

Sponsored by
AEIC Academic Exchange Information Center (China)

Organized by
Queensland University of Technology (Australia)

Published by
SPIE

Volume 12303

Proceedings of SPIE 0277-786X, V. 12303

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 *International Conference on Cloud Computing, Internet of Things, and Computer Applications (CICA 2022)*, edited by Warwick Powell and Amr Tolba, Proc. of SPIE 12303, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

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

ISBN: 9781510656673
ISBN: 9781510656680 (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*

CLOUD COMPUTING APPLICATION AND DATA ALGORITHM PROCESSING

12303 02 **Genetic algorithm for resolving vehicle routing problem** [12303-18]

12303 03 **Discussion on reservoir numerical simulation of fracturing development of low-permeability reservoir** [12303-97]

12303 04 **Finite element calculation study on using carbon fiber reinforced plastics to reinforce concrete torsion column** [12303-90]

12303 05 **Design and implementation of GIS system of map service for transformation of scientific and technological achievements** [12303-75]

12303 06 **Optimizing distributed networking with big data scheduling and cloud computing** [12303-21]

12303 07 **On MM algorithms for Cox model with right-censored data** [12303-121]

12303 08 **Outlier detection of financial high frequency data based on fuzzy clustering algorithm** [12303-125]

12303 09 **Algorithm of ship maneuver scheme of multiple targets in marine environment** [12303-122]

12303 0A **Implementation of Bayesian high dimensional data analysis with SIR model program** [12303-132]

12303 0B **Research and implementation of the affinity scheduling algorithm of logical data block in big data analysis system** [12303-72]

12303 0C **A water resource allocation method based on configuration relationship matrix and Excel** [12303-123]

12303 0D **Construction of smart stores in automobile marketing system based on big data** [12303-127]

12303 0E **Privacy-preserving method of edge computing based on secret sharing and homomorphic encryption** [12303-54]

12303 0F **Large-scale data privacy-preserving method based on data perturbation** [12303-52]

12303 0G **The design, development, and application of Chinese music grand ceremony database** [12303-116]

12303 0H **Construction and research of system capability training system based on cloud computing** [12303-113]

12303 0I **Research on medical data protection based on differential privacy** [12303-46]

12303 0J **KubeRM: a distributed rule-based security management system in cloud native environment** [12303-128]

12303 0K **Design and implementation of a decision tree classification algorithm for radar signal recognition** [12303-57]

12303 0L **Identity-based one-pass key agreement and encryption protocol for secure IP** [12303-48]

12303 0M **Delay optimization in UAV-enabled mobile-edge computing collaborative system** [12303-33]

12303 0N **A heterogeneous data-oriented task engine in the National Earthquake Precursor Network** [12303-55]

12303 0O **Research on clustering algorithm of cognitive rehabilitation based on multi-dimensional objects** [12303-42]

12303 0P **Efficient privacy-preserving k-nearest neighbors in cloud computing** [12303-23]

12303 0Q **Sewage treatment process control method based on improved particle swarm algorithm** [12303-114]

12303 0R **Research on resource allocation technology based on cloud computing** [12303-135]

12303 0S **Research on resource optimization scheme based on cloud computing environment** [12303-134]

12303 0T **Malicious code classification method based on API sequence and text-CNN** [12303-49]

12303 0U **Visualized performance evaluation of 3D CAD software based on the characterization of test data by cloud model** [12303-11]

12303 0V **Resistance to side-channel attacks of CPU based on random power consumption disturbance strategy** [12303-14]

12303 0W **Optimal allocation of water resources based on genetic algorithms: a case study in the Colorado Basin, USA** [12303-108]

12303 0X **Research on data security and privacy protection methods in cloud computing environment** [12303-136]

12303 0Y **Design and analysis of machine aided translation system in cloud computing mode** [12303-74]

12303 0Z **Research on the optimal number of equipment maintenance personnel in enterprises** [12303-67]

ARTIFICIAL INTELLIGENCE TECHNOLOGY AND INTERNET OF THINGS APPLICATIONS

12303 10 **Remote sensing monitoring of cyanobacteria density in Taihu Lake based on PIE-engine** [12303-31]

12303 11 **Decision-making method for railway emergency based on prospect theory** [12303-70]

12303 12 **Application and development of reservoir numerical simulation** [12303-91]

12303 13 **Research and application of the upgraded power dispatch strategy for complex AC/DC interconnected power grid** [12303-124]

12303 14 **Edge computing for the intelligent perception in energy interconnection** [12303-137]

12303 15 **Life prediction of power Internet of Things equipment based on improved genetic algorithm** [12303-81]

12303 16 **Accurate face swap using cycleGAN** [12303-131]

12303 17 **Sentiment analysis method based on CNN and attention mechanism** [12303-66]

12303 18 **A study on the intelligent optimization of subway security check space in the context of epidemic** [12303-130]

12303 19 **Architecture of discrete manufacturing system based on CPS** [12303-92]

12303 1A **Research on blockchain-based crowdsourcing mechanism for knowledge system** [12303-36]

12303 1B **Application of artificial intelligence-based video image processing technology in security industry** [12303-117]

12303 1C **Application research of logistics warehousing system based on Internet of Things and artificial intelligence** [12303-84]

12303 1D **Automatic identification and detection system of digital vernier caliper jumps based on CNN** [12303-51]

12303 1E **Entry traceability technology based on requirement knowledge graph** [12303-28]

12303 1F **Detection of pantograph-catch arc in urban rail transit based on correlation filtering** [12303-60]

12303 1G **Military application of blockchain technology for future battlefield operations** [12303-22]

12303 1H **A number theoretic transform accelerator with two parallel simplified butterfly units** [12303-44]

12303 1I **Test methods for RFID tags on individual police equipment** [12303-65]

12303 1J **Application of recommendation algorithm combined with expert knowledge in apparel field** [12303-61]

12303 1K **Sentiment analysis of Chinese comments on OTA website using BERT and LSTM** [12303-87]

12303 1L **Frequency adjustable energy harvesting for autonomous wireless sensor nodes** [12303-26]

12303 1M **Research on employment quality improvement of college students under the perspective of artificial intelligence** [12303-34]

12303 1N **Design and promotion of cost-effective IOT-based heart rate monitoring** [12303-115]

12303 1O **Design and implementation of smart home system based on IOS platform** [12303-25]

12303 1P **A review of auxiliary hardware architectures supporting dynamic taint analysis** [12303-109]

12303 1Q **Research on the application of Internet of Things based on big data cloud computing platform** [12303-98]

12303 1R **Online Travel Agencies (OTAs): a new product of e-commerce** [12303-35]

12303 1S **Research on universal real-time architecture of spacecraft embedded software** [12303-7]

12303 1T **Campus static guide sign systems based on ergonomics** [12303-9]

12303 1U **On orbit maintenance of spacecraft software for connectionless based on ethernet method and application** [12303-16]

12303 1V **Exploring translators' perceptions of and editing actions on post-editing of machine translation** [12303-6]

12303 1W **Research on spatial and temporal characteristics of taxi based on improved K-means with entropy weight: a perspective combined with urban functional area** [12303-77]

12303 1X **Research and practice of JAVA virtual machine exception handling mechanism testing technology** [12303-88]

12303 1Y **Eagle: a complex event processing system** [12303-103]

COMPUTER NETWORKS AND MODELING PREDICTIVE OPTIMIZATION

12303 1Z **Freezing and thawing erosion test and particle flow simulation of caragana root-soil complex** [12303-45]

12303 20 **Numerical simulation of oblique single shear test of arbor taproot-soil composite** [12303-99]

12303 21 **Numerical study on dynamic compression of concrete based on meso-scale particle element modeling and fractal theory** [12303-40]

12303 22 **Finite element analysis on through tied-arch bridge with inclined arch rib during construction stage** [12303-80]

12303 23 **Analysis of individual cases of foggy environment in Qiongzhou Strait based on numerical simulation** [12303-53]

12303 24 **A simulation model based on DCGAN to generate 2D animation avatars** [12303-41]

12303 25 **Research on binocular disparity computing technology of mobile terminal** [12303-96]

12303 26 **Ship video detection based on improved YOLOv4-Tiny** [12303-129]

12303 27 **Simulation research on drainage of Tangxun Lake Basin** [12303-102]

12303 28 **Android malware detection method based on new gray image and VGG** [12303-32]

12303 29 **Early fire smoke detection model based on YOLOv5** [12303-73]

12303 2A **A deep residual long short-term memory network model for traffic flow prediction** [12303-58]

12303 2B **Dynamic law of migrant workers' urban integration based on Markov chain model: a case study of Xi'an city** [12303-79]

12303 2C **Research on disk failure prediction based on random forest algorithm** [12303-27]

12303 2D **Research on authenticity identification of Chinese painting based on computer technology** [12303-120]

12303 2E **Simulation study on the spreading characteristics of fire smoke in underground cable trench** [12303-56]

12303 2F **Rapid networking method of multi-task UAV swarm based on leader-follower model** [12303-30]

12303 2G **Numerical simulation research on the correlation between bicycle drag and dynamic pressure** [12303-39]

12303 2H **Research on automatic detection of text-oriented counterfactual statements** [12303-47]

12303 2I **Construction of real-time model of airport fire truck fire pump based on improved neural network with visual simulation** [12303-95]

12303 2J **Identifying protein complexes based on core-attachment from weighted dynamic network** [12303-69]

12303 2K **Realization of garbage classification system based on WeChat mini program** [12303-50]

12303 2L **Analysis of applied network information technology in physical education training system** [12303-119]

12303 2M **Design and development of engineering supervision management information system** [12303-71]

12303 2N **Research on financial loan default risk prediction based on integrated model** [12303-89]

12303 2O **Design and implementation of semi-object simulation system** [12303-13]

12303 2P **Research on clock synchronization of time-triggered ethernet** [12303-3]

12303 2Q **Accelerate bit manipulation in XiangShan processer using RISC-V B extension and instruction fusion** [12303-5]

12303 2R **PIM-HBMSim: a processing in memory simulator based on high bandwidth memory** [12303-10]

12303 2S **A design of fetch target buffer implemented on XiangShan processor** [12303-4]

12303 2T **High-performance and extensible architecture design of design resources integration and sharing platform** [12303-8]

12303 2U **Parameter control strategy of DC microgrid based on interconnected converter control** [12303-138]

12303 2V **Design and implementation of predictive model for urban new energy charging equipment based on genetic algorithm optimized BP neural network** [12303-100]

12303 2W **Power transaction optimization model based on new energy power prediction algorithm** [12303-63]

12303 2X **Building and application of water-limited vegetation growth simulation model** [12303-106]

12303 2Y **Desilting simulation and effect of the desilting tunnel in estuary of Taohe River in Liujiaxia reservoir** [12303-64]

12303 2Z **Prediction of novel coronavirus pneumonia epidemic trend based on ARIMA model** [12303-59]