# PROCEEDINGS OF SPIE

# International Conference on Computer Network Security and Software Engineering (CNSSE 2024)

Dimitrios Karras Mehdi Gheisari Editors

23–25 February 2024

Sanya, China

Organized by Southwest University of Science and Technology (China)

Sponsored by
AEIC Academic Exchange Information Centre (China)

Published by SPIE

Volume 13175

Proceedings of SPIE 0277-786X, V. 13175

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 Computer Network Security and Software Engineering (CNSSE 2024), edited by Dimitrios A. Karras, Mehdi Gheisari, Proc. of SPIE 13175, Sevendigit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510680234

ISBN: 9781510680241 (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

vii Conference Committee

SESSION 1	NETWORK SECURITY ASSESSMENT AND PRIVACY PROTECTION
13175 02	CATL: contrast adaptive transfer learning for cross-system log anomaly detection [13175-40]
13175 03	Vehicle CAN bus intrusion detection model based on Bayesian network [13175-76]
13175 04	EPTDMS: efficient and privacy-preserving top-k disease matching scheme for cloud-assisted e-healthcare system [13175-9]
13175 05	Efficient multiparty private set intersection protocol based on function secret sharing [13175-13]
13175 06	Based on QUBO models with quantum-inspired algorithms to enhance the CVQKD systems to ensure security of hacking [13175-38]
13175 07	Trajectory privacy preserving method for transmission resources [13175-37]
13175 08	A new zhoneypot defence for deep neural networks [13175-19]
13175 09	On-chain federated learning approach for Internet of Vehicles [13175-3]
13175 0A	Isolate cache shield: defending cache attacks via cache set isolation [13175-51]
13175 OB	Physical layer secure transmission method based on MSK modulator structure hopping [13175-74]
13175 0C	Research on malicious code detection and classification based on dynamic and static features [13175-16]
13175 0D	Real-time traffic intrusion detection based on CNN-LSTM deep neural networks [13175-20]
13175 OE	Privacy federation learning framework based on principal component analysis [13175-23]
13175 OF	Low-code vulnerability identification based on TextCNN [13175-4]
13175 0G	Research on health evaluation method of data center security protection system [13175-72]
13175 OH	Design of a flow detection system for high pressure reducing valves in ships [13175-10]

13175 01	CBAN: A DDoS detection method based on CNN, BiGRU, and attention mechanism [13175-69]
13175 OJ	A secure routing protocol for wireless sensor network [13175-41]
13175 OK	Zero trust-based federated autonomous technology for code repository [13175-6]
13175 OL	A hierarchical software architecture for smart firefighting platform [13175-82]
13175 OM	Synergizing next-generation firewalls and defense-in-depth strategies in a dynamic cybersecurity landscape [13175-39]
13175 ON	In-vehicle CAN bus security communication protocol based on identity encryption [13175-17]
SESSION 2	INTELLIGENT DATA VISUALIZATION AND IMAGE PROCESSING
13175 00	Text-based sentiment analysis for evaluating the service provider professionalism (SPP) of macro work on online labor platforms (OLPs) [13175-15]
13175 OP	BGP prefix hijack detection algorithm based on MOAS event feature [13175-66]
13175 0Q	Reversible data hiding in JPEG images based on two-stage embedding [13175-81]
13175 OR	Research on a more safe image encryption communication algorithm [13175-79]
13175 OS	Research on network topology visualization under HTML5 technology [13175-61]
13175 OT	Research on privacy data processing based on symmetric encryption algorithm [13175-11]
13175 OU	Multiview stereo reconstruction based on context-aware transformer [13175-68]
13175 OV	Evaluation of civil aircraft project management capability based on improved analytic hierarchy process algorithm [13175-62]
13175 OW	Research on key privacy protection technologies supporting flexible distributed resource layered aggregation transactions [13175-30]
13175 OX	Haptic texture rendering based on vision [13175-80]
13175 OY	Method and design of encrypted image hiding based on random LSB matching [13175-63]
13175 OZ	FMAMPN: lightweight feature map attention multipath network for semantic segmentation of remote sensing image [13175-33]
13175 10	Fuzzing technology based on suspicious basic block orientation [13175-83]

13175 11	TeTPCM: building endogenous trusted computing on trusted execution environment [13175-35]
13175 12	Research on adaptive beamforming algorithm based on FPGA [13175-67]
13175 13	3D reconstruction in industrial environments based on an improved neural radiation field method research [13175-34]
13175 14	Load-balancing system for SDN data center based on improved ant colony optimization [13175-29]
13175 15	Cross-language entity alignment based on graph convolution neural network and attribute information [13175-12]
13175 16	Securing digital media: embedding and extracting encrypted digital watermarks using HTML5 Canvas [13175-2]
13175 17	Image steganalysis based on model compression [13175-21]
13175 18	Research on distributed heterogeneous task scheduling and resource allocation algorithms based on deep learning [13175-75]
13175 19	Research on key distribution methods supporting trusted data migration of cloud platform [13175-78]
SESSION 3	AUTOMATIC SOFTWARE DESIGN AND SYSTEM CONTROL
	AUTOMATIC SOFTWARE DESIGN AND SYSTEM CONTROL
<b>SESSION 3</b> 13175 1A	AUTOMATIC SOFTWARE DESIGN AND SYSTEM CONTROL  An improved method for reverse engineering ECU firmware [13175-70]
13175 1A	An improved method for reverse engineering ECU firmware [13175-70]
13175 1A 13175 1B	An improved method for reverse engineering ECU firmware [13175-70]  Can large language model replace static analysis tools [13175-24]
13175 1A 13175 1B 13175 1C	An improved method for reverse engineering ECU firmware [13175-70]  Can large language model replace static analysis tools [13175-24]  Automatic mapping based on CVE and ATT&CK [13175-85]
13175 1A 13175 1B 13175 1C 13175 1D	An improved method for reverse engineering ECU firmware [13175-70]  Can large language model replace static analysis tools [13175-24]  Automatic mapping based on CVE and ATT&CK [13175-85]  Research on WCET assessment method of airborne display software [13175-52]  Prediction and application of wax thickness on tube wall based on improved DGM (1,1) model
13175 1A 13175 1B 13175 1C 13175 1D 13175 1E	An improved method for reverse engineering ECU firmware [13175-70]  Can large language model replace static analysis tools [13175-24]  Automatic mapping based on CVE and ATT&CK [13175-85]  Research on WCET assessment method of airborne display software [13175-52]  Prediction and application of wax thickness on tube wall based on improved DGM (1,1) model [13175-71]
13175 1A 13175 1B 13175 1C 13175 1D 13175 1E 13175 1F	An improved method for reverse engineering ECU firmware [13175-70]  Can large language model replace static analysis tools [13175-24]  Automatic mapping based on CVE and ATT&CK [13175-85]  Research on WCET assessment method of airborne display software [13175-52]  Prediction and application of wax thickness on tube wall based on improved DGM (1,1) model [13175-71]  Optimization of parallel compilation techniques using genetic algorithms [13175-18]

13175 1J	Design and implementation of electronic medical record information management system of community health service center $[13175-31]$
13175 1K	A keystone extension to defend against cache timing attacks [13175-54]
13175 1L	Innovative design and analysis of C language program based on game development orientation [13175-53]
13175 1M	Construction of unmanned path tracking optimization control system based on MPC algorithm $[13175\text{-}42]$
13175 1N	Software vulnerability detection method based on code attribute graph presentation and Bi-LSTM neural network extraction [13175-60]
13175 10	Atmospheric coherence length instrument remote control network software system design [13175-77]
13175 1P	Blockchain-based federal learning program for drone safety [13175-8]
13175 1Q	Design of lightweight memory protection solution based on RISC-V processor [13175-56]
13175 1R	A method for microservice partitioning of monolithic systems based on multifeature fusion [13175-44]
13175 18	Design method and system of software application based on intelligent terminal [13175-25]
13175 1T	Core software supportability engineering of new generation information equipment [13175-28]
13175 1U	Design of kinematics simulation software for 6R series robot [13175-22]
13175 1V	Design of embedded target turntable system based on BS mode [13175-26]
13175 1W	An approach for microservices-oriented migration based on business information and GNN [13175-57]
13175 1X	Research and implementation of urban water supply pipe network management system based on WebGIS [13175-50]

## **Conference Committee**

#### Conference Chairman

Mohand Tahar Kechadi, University College Dublin (Ireland)

#### **Publication Chairs**

**Witold Pedrycz**, University of Alberta (Canada) **Dimitrios Karras**, National and Kapodistrian University of Athens (Greece)

**Qingming Zhang**, Southwest University of Science and Technology (China)

### **Program Committee Chairs**

Zuqing Zhu, University of Science and Technology of China (China)
 Xiaolin Jia, Southwest University of Science and Technology (China)
 Yaobin Wang, Southwest University of Science and Technology (China)

#### **Technical Program Committee**

Jian Cao, Air Force Engineering University (China)

Zongxi Li, Xi'an Jiaotong University (China)

Lei Zhang, Henan University (China)

Jalil Piran, Sejong University (South Korea)

Nirmalya Thakur, University of Cincinnati (United States)

Wei Wang, Xidian University (China)

Mehdi Gheisari, Islamic Azad university (Iran)

Leau Yu Beng, Universiti Malaysia Sabah (Malaysia)

Suresh Kaswan, Sanskriti University (India)

**Satnam Kaur**, Thapar Institute of Engineering and Technology (India)

Pradip Jawandhiya, Pankaj Laddhad Institute of Technology &

Management Studies (India)

Konstantinos Giannoutakis, University of Macedonia (Greece)

## Organizing Committee

Ning Li, Zhejiang Foreign Languages University (China)

Sanmei Lu, South China Agricultural University (China)

Jianlin Gong, Guangdong University of Technology (China)

**Guoxiong Peng**, Jinan University (China)

**Zhengquo Fan**, Sun Yat-sen University (China)

Xiaodong Wang, Guangdong Sports University (China)

**Shaohui Du**, Guangdong Light Industry Vocational and Technical College (China)

Yinghong Li, Guangdong Pharmaceutical University (China)

Yibin Zeng, Guangzhou Medical College (China)

**Yushan Huang**, Private Hualian College (China)

Xiqian Zhang, Guangdong Second Normal University (China)

Jun Wang, Shanghai International Studies University (China)