Lecture Notes in Computer Science

11632

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board Members

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology Madras, Chennai, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

More information about this series at http://www.springer.com/series/7410

Xingming Sun · Zhaoqing Pan · Elisa Bertino (Eds.)

Artificial Intelligence and Security

5th International Conference, ICAIS 2019 New York, NY, USA, July 26–28, 2019 Proceedings, Part I



Editors
Xingming Sun
Nanjing University of Information
Science and Technology
Nanjing, China

Elisa Bertino D Purdue University West Lafayette, IN, USA Zhaoqing Pan
Nanjing University of Information
Science and Technology
Nanjing, China

ISSN 0302-9743 ISSN 1611-3349 (electronic) Lecture Notes in Computer Science ISBN 978-3-030-24273-2 ISBN 978-3-030-24274-9 (eBook) https://doi.org/10.1007/978-3-030-24274-9

LNCS Sublibrary: SL4 - Security and Cryptology

© Springer Nature Switzerland AG 2019

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The 5th International Conference on Artificial Intelligence and Security (ICAIS 2019), formerly called the International Conference on Cloud Computing and Security (ICCCS), was held during July 26–28, 2019, at New York University, New York, USA. Over the past four years, ICAIS has become a leading conference for researchers and engineers to share their latest results from research, development, and applications in the fields of artificial intelligence and information security.

We used the Microsoft Conference Management Toolkits (CMT) system to manage the submission and review processes of ICAIS 2019. We received 1529 submissions from 20 countries and regions, including USA, Canada, UK, Italy, Ireland, Japan, Russia, France, Australia, South Korea, South Africa, India, Iraq, Kazakhstan, Indonesia, Vietnam, Ghana, China, Taiwan, and Macao, etc. The submissions cover the areas of artificial intelligence, big data, cloud computing and security, information hiding, IoT security, multimedia forensics, encryption and cybersecurity, and so on. We thank our Technical Program Committee members and external reviewers for their efforts in reviewing papers and providing valuable comments to the authors. From the total of 1,529 submissions, and based on at least three reviews per submission, the Program Chairs decided to accept 230 papers, yielding an acceptance rate of 15%. The volume of the conference proceedings contains all the regular, poster, and workshop papers.

The conference program was enriched by a series of keynote presentations, and the keynote speakers included: Nasir Memon, New York University, USA; Edward Colbert, Virginia Tech Hume Center for National Security and Technology, USA; Quanyan Zhu, New York University, USA; Zhihua Xia, Nanjing University of Information Science and Technology, China; Tom Masino, TradeWeb, USA; etc. We thank them for their wonderful speeches.

There were 45 workshops organized at ICAIS 2019, covering all the hot topics in artificial intelligence and security. We would like to take this moment to express our sincere appreciation for the contribution of all the workshop chairs and their participants. We would like to extend our sincere thanks to all authors who submitted papers to ICAIS 2019 and to all Program Committee members. It was a truly great experience to work with such talented and hard-working researchers. We also appreciate the external reviewers for assisting the Program Committee members in their particular areas of expertise. Moreover, we want to thank our sponsors: Nanjing University of Information Science and Technology, Springer, New York University, IEEE Broadcast Technology Society (BTS) Nanjing Chapter, ACM China, Michigan State University, Taiwan Cheng Kung University, Taiwan Dong Hwa University, Taiwan Providence University, Nanjing University of Aeronautics and Astronautics, State Key Laboratory of Integrated Services Networks, and the National Nature Science Foundation of China.

May 2019

Xingming Sun Zhaoqing Pan Elisa Bertino

Organization

General Chairs

Yun Q. Shi New Jersey Institute of Technology, USA

Mauro Barni University of Siena, Italy

Xingang You China Information Technology Security Evaluation

Center, China

Elisa Bertino Purdue University, USA Quanyan Zhu New York University, USA

Xingming Sun Nanjing University of Information Science

and Technology, China

Technical Program Chairs

Aniello Castiglione University of Salerno, Italy

Yunbiao Guo China Information Technology Security Evaluation

Center, China

Suzanne K. McIntosh New York University, USA

Zhihua Xia Nanjing University of Information Science

and Technology, China

Victor S. Sheng University of Central Arkansas, USA

Publication Chair

Zhaoqing Pan Nanjing University of Information Science

and Technology, China

Workshop Chair

Baowei Wang Nanjing University of Information Science

and Technology, China

Organization Chairs

Edward Wong New York University, USA

Zhangjie Fu Nanjing University of Information Science

and Technology, China

Technical Program Committee

Saeed Arif University of Algeria, Algeria

Anthony Ayodele University of Maryland University College, USA

Zhifeng Bao Royal Melbourne Institute of Technology University,

Australia

Zhiping Cai National University of Defense Technology, China

Qingdao Binhai University, China Ning Cao

Paolina Centonze Iona College, USA

Chin-chen Chang Feng Chia University, Taiwan, China

Taiwan Dong Hwa University, Taiwan, China Han-Chieh Chao Nanjing University of Aeronautics and Astronautics, Bing Chen

China

Hanhua Chen Huazhong University of Science and Technology,

China

Xiaofeng Chen Xidian University, China Jieren Cheng Hainan University, China Lianhua Chi

IBM Research Center, Australia

Kim-Kwang Raymond University of Texas at San Antonio, USA

Choo

Ilyong Chung Chosun University, South Korea

Robert H. Deng Singapore Management University, Singapore

University of Cincinnati, USA Jintai Ding University of Central Florida, USA Xinwen Fu

Nanjing University of Information Science Zhangjie Fu

and Technology, China

Tampere University of Technology, Finland Moncef Gabbouj

Ruili Geng Spectral MD, USA

Hong Kong Polytechnic University, SAR China Song Guo

Xi'an Jiaotong University, China Jinsong Han Mohammad Mehedi Hassan King Saud University, Saudi Arabia

Wuhan University, China Debiao He

University College Dublin, Ireland Russell Higgs University Technology Sydney, Australia Dinh Thai Hoang

Nanfang College of Sun Yat-Sen University, China Wien Hong

Chih-Hsien Hsia National Ilan University, Taiwan, China Chung Hua University, Taiwan, China Robert Hsu

South China University of Technology, China Yongjian Hu South China Agricultural University, China Qiong Huang

Xinyi Huang Fujian Normal University, China Yongfeng Huang Tsinghua University, China

Zhiqiu Huang Nanjing University of Aeronautics and Astronautics,

China

Patrick C. K. Hung University of Ontario Institute of Technology, Canada

Farookh Hussain University of Technology Sydney, Australia Huazhong University of Science and Technology, Hai Jin

China

City University of Hong Kong, SAR China Sam Tak Wu Kwong Taiwan Cheng Kung University, Taiwan, China Chin-Feng Lai

Loukas Lazos University of Arizona, USA Sungyoung Lee Kyung Hee University, South Korea

Bin Li
Chengcheng Li
University of Cincinnati, USA
Feifei Li
Utah State University, USA
Jiguo Li
Jin Li
Guangzhou University, China
Jing Li
Rutgers University, USA

Kuan-Ching Li Providence University, Taiwan, China

Peng Li University of Aizu, Japan

Xiaolong Li
Yangming Li
Beijing Jiaotong University, China
University of Washington, USA

Luming Liang Uber Technology, USA

Haixiang Lin Leiden University, The Netherlands

Xiaodong Lin University of Ontario Institute of Technology, Canada

Zhenyi Lin Verizon Wireless, USA

Alex Liu Michigan State University, USA

Guangchi Liu Stratifyd Inc., USA

Guohua Liu Donghua University, China Joseph Liu Monash University, Australia

Mingzhe Liu Chengdu University of Technology, China Pingzeng Liu Shandong Agricultural University, China Quansheng Liu University of South Brittany, France Xiaodong Liu Edinburgh Napier University, UK

Yuling Liu Hunan University, China
Zhe Liu University of Waterloo, Canada
Wei Lu Sun Yat-sen University, China

Daniel Xiapu Luo Hong Kong Polytechnic University, SAR China

Junzhou Luo Southeast University, China

Xiangyang Luo Zhengzhou Science and Technology Institute, China

Suzanne K. McIntosh
Nasir Memon
New York University, USA
Nasir Memon
New York University, USA
Sangman Moh
Chosun University, South Korea
University of Wollongong, Australia
Jiangqun Ni
Sun Yat-sen University, China
Refal Niemiec
University of Information Technology

and Management, Poland

Zemin Ning Wellcome Trust Sanger Institute, UK

Shaozhang Niu Beijing University of Posts and Telecommunications,

China

Srikant Ojha Sharda University, India
Jeff Z. Pan University of Aberdeen, UK
Wei Pang University of Aberdeen, UK
Rong Peng Wuhan University, China

Chen Qian University of California Santa Cruz, USA

Zhenxing Qian Fudan University, China

Chuan Qin University of Shanghai for Science and Technology,

China

Jiaohua Qin Central South University of Forestry and Technology,

China

Yanzhen Qu Colorado Technical University, USA Zhiguo Qu Nanjing University of Information Science

and Technology, China

Kui Ren State University of New York, USA

Arun Kumar Sangaiah VIT University, India
Zheng-guo Sheng University of Sussex, UK
Robert Simon Sherratt University of Reading, UK

Yun Q. Shi
New Jersey Institute of Technology, USA
Frank Y. Shih
New Jersey Institute of Technology, USA
King Saud University, Saudi Arabia

Guang Sun Hunan University of Finance and Economics, China

Jiande Sun Shandong Normal University, China
Jianguo Sun Harbin University of Engineering, China
Jianyong Sun Xi'an Jiaotong University, China

Krzysztof Szczypiorski Warsaw University of Technology, Poland

Tsuyoshi Takagi Kyushu University, Japan
Shanyu Tang University of West London, UK
Xianping Tao Nanjing University, China

Jing Tian National University of Singapore, Singapore

Yoshito Tobe Aoyang University, Japan

Cezhong Tong Washington University in St. Louis, USA Pengjun Wan Illinois Institute of Technology, USA

Cai-Zhuang Wang Ames Laboratory, USA
Ding Wang Peking University, China

Guiling Wang

New Jersey Institute of Technology, USA
Honggang Wang

University of Massachusetts-Dartmouth, USA

Jian Wang Nanjing University of Aeronautics and Astronautics,

China

Jie Wang University of Massachusetts Lowell, USA

Jing Wang Changsha University of Science and Technology,

China

Jinwei Wang Nanjing University of Information Science

and Technology, China

Liangmin Wang

Ruili Wang

Massey University, China

Massey University, New Zealand

Dublin City University, Ireland

Xiaokang Wang

St. Francis Xavier University, Canada

Zhaoxia Wang A-Star, Singapore

Sheng Wen Swinburne University of Technology, Australia

Jian Weng Jinan University, China Edward Wong New York University, USA

Eric Wong University of Texas at Dallas, USA

Q. M. Jonathan Wu University of Windsor, Canada Shaoen Wu Ball State University, USA

Shuangkui Xia Beijing Institute of Electronics Technology

and Application, China

Lingyun Xiang Changsha University of Science and Technology,

China

Shijun Xiang Jinan University, China Yang Xiang Deakin University, Australia Yang Xiao The University of Alabama, USA

Haoran Xie The Education University of Hong Kong, SAR China

Naixue Xiong Northeastern State University, USA

Xin Xu Wuhan University of Science and Technology, China Wei Qi Yan Auckland University of Technology, New Zealand Aimin Yang Guangdong University of Foreign Studies, China Ching-Nung Yang Taiwan Dong Hwa University, Taiwan, China Chunfang Yang Zhengzhou Science and Technology Institute, China

Fan Yang University of Maryland, USA

Guomin Yang
University of Wollongong, Australia

Ming Yang Southeast University, China
Qing Yang University of North Texas, USA

Yuqiang Yang Bohai University, USA
Ming Yin Purdue University, USA
Xinchun Yin Yangzhou University, China

Shaodi You Australian National University, Australia Kun-Ming Yu Chung Hua University, Taiwan, China

Yong Yu University of Electronic Science and Technology

of China, China

Gonglin Yuan Guangxi University, China

Mingwu Zhang Hubei University of Technology, China

Wei Zhang Nanjing University of Posts and Telecommunications,

China

Weiming Zhang University of Science and Technology of China, China

Xinpeng Zhang Fudan University, China

Yan Zhang Simula Research Laboratory, Norway

Yanchun Zhang Victoria University, Australia Yao Zhao Beijing Jiaotong University, China

Linna Zhou University of International Relations, China

Organizing Committee

Xianyi Chen Nanjing University of Information Science

and Technology, China

Yadang Chen Nanjing University of Information Science

and Technology, China

Beijing Chen Nanjing University of Information Science

and Technology, China

Huajun Huang Central South University of Forestry and Technology,

China

Jielin Jiang Nanjing University of Information Science

and Technology, China

Zilong Jin Nanjing University of Information Science

and Technology, China

Yan Kong Nanjing University of Information Science

and Technology, China

Yiwei Li Columbia University, USA Yuling Liu Hunan University, China

Lirui Qiu Nanjing University of Information Science

and Technology, China

Zhiguo Qu Nanjing University of Information Science

and Technology, China

Guang Sun Hunan University of Finance and Economics, China

Huiyu Sun New York University, USA

Le Sun Nanjing University of Information Science

and Technology, China

Jian Su Nanjing University of Information Science

and Technology, China

Lina Tan Hunan University of Commerce, China
Qing Tian Nanjing University of Information Science

and Technology, China

Yuan Tian King Saud University, Saudi Arabia Zuwei Tian Hunan First Normal University, China

Xiaoliang Wang Hunan University of Science and Technology, China Lingyun Xiang Changsha University of Science and Technology,

China

Lizhi Xiong Nanjing University of Information Science

and Technology, China

Leiming Yan Nanjing University of Information Science

and Technology, China

Hengfu Yang Hunan First Normal University, China Li Yu Nanjing University of Information Science

and Technology, China

Zhili Zhou Nanjing University of Information Science

and Technology, China

Contents – Part I

Cloud Computing

Fuzzy Clustering: A New Clustering Method in Heterogeneous Medical Records Searching	3
NOAA-LSTM: A New Method of Dialect Identification	16
Evaluation Method of Teachers' Teaching Ability Based on BP Neural Network	27
Research on the Promotion of Tibetan New Words and Platform Design Hao Li, Yuan Sun, Wei Song, and Jie Qin	39
A Classification Model for Drug Addicts Based on Improved Random Forests Algorithm	51
Studying L-Diversity and K-Anonymity Over Datasets with Sensitive Fields	63
Power System Transient Stability Prediction Algorithm Based on ReliefF and LSTM	74
A No-Pairing Proxy Re-Encryption Scheme for Data Sharing in Untrusted Cloud	85
E-Sports Ban/Pick Prediction Based on Bi-LSTM Meta Learning Network Cheng Yu, Wan-ning Zhu, and Yu-meng Sun	97
Bottlenecks and Feasible Solutions of Data Field Clustering in Impact Factor, Time Resolution, Selecting Core Objects and Merging Process	106
Detection of Microblog Overlapping Community Based on Multidimensional Information and Edge Distance Matrix	121

Soil Zone Based on Pavement Settlement Theory	137
Legal Case Inspection: An Analogy-Based Approach to Judgment Evaluation	148
A Novel Noise Filter Based on Multiple Voting	159
Fuzzy Control Method for Path Tracking System of Combine Harvester Nan Qiao, Li-hui Wang, Yue-xin Zhang, and Tang Xinhua	171
Research on Opinion Spam Detection by Time Series Anomaly Detection Ye Wang, Wanli Zuo, and Ying Wang	182
Application of Machine Learning Methods for Material Classification with Multi-energy X-Ray Transmission Images	194
Intra-class Classification of Architectural Styles Using Visualization of CNN	205
MSE-Net: Pedestrian Attribute Recognition Using MLSC and SE-Blocks Miaomiao Lou, Zhenxia Yu, Feng Guo, and Xiaoqiang Zheng	217
CBAM-GAN: Generative Adversarial Networks Based on Convolutional Block Attention Module	227
A Novel Distributed Knowledge Reasoning Model	237
Research on Detection Method of Abnormal Traffic in SDN	248
Research on Constructing Technology of Implicit Hierarchical Topic Network Based on FP-Growth	260
PPD-DL: Privacy-Preserving Decentralized Deep Learning	273

Towards Edge Computing Based Distributed Data Analytics Framework in Smart Grids	283
Chunhe Song, Tong Li, Xu Huang, Zhongfeng Wang, and Peng Zeng	200
Android Malware Identification Based on Traffic Analysis	293
Unsupervised Traditional Chinese Medicine Text Segmentation Combined with Domain Dictionary	304
Research on the Efficiency and Application of Ship-Helicopter Cooperative Search	315
Cellular Neural Network Based Contour Detection for Seismic Image Jiangang Xie, Guiying He, and Xiaohong Xiao	327
Discovering New Sensitive Words Based on Sensitive Information Categorization	338
A Dynamic Event Region Tracking Approach Based on Node Calibration Xiang Yu, Hui Lu, Le Wang, and Dapeng Man	347
A Graph Updating Method of Data Theft Detection Based on Rough Set Xiang Yu, Le Wang, Shuang Chen, and Yanbo Li	358
A Tutorial of Graph Representation	368
Ground-Based Cloud Images Recognition Based on GAN and PCANet Liling Zhao, Yi Lin, Zelin Zhang, and Siqi Wang	379
Sparse Representation-Based Radiomics in the Diagnosis of Thyroid Nodules	391
Local Smoothing Constraint in Convolutional Neural Network for Image Denoising	402
Perceptual Loss Based Super-Resolution Reconstruction from Single Magnetic Resonance Imaging	411
DWI Fiber Tracking with Functional MRI of White Matter	425

Multi-objective Investment Decision Making Based on an Improved SPEA2 Algorithm	434
Power Load Forecasting Based on Adaptive Deep Long Short-Term Memory Network	444
Optimized White Matter Fiber Reconstruction Using Combination of Diffusion and Functional MRI	454
Convolutional Neural Networks for Scene Image Recognition	463
A Classification Model of Power Equipment Defect Texts Based on Convolutional Neural Network	475
Research on Artificial Intelligence Technology in Computer Network Technology	488
Research on Detection Method of Unhealthy Message in Social Network Yabin Xu, Yongqing Jiao, Shujuan Chen, and Yangyang Li	497
Image Authentication by Single Target Region Detection Huanrong Tang, Zhuosong Fu, Jianquan Ouyang, and Yunhua Song	509
Security Approaches and Crypto Algorithms in Mobile Cloud Storage Environment to Ensure Data Security	516
Probe-Polling: A Polling Based MAC Protocol for Energy Harvesting Wireless Sensor Networks	525
An Dynamic Protocol for the Quantum Secure Multi-party Summation Based On Commutative Encryption	537
Optimal Resource Allocation for Energy Harvesting Cognitive Radio Network with Q Learning	548
Facial Expression Recognition Based on Complete Local Binary Pattern and Convolutional Neural Network	561

Contents – Part I	xvii
A Novel Malware Detection and Classification Method Based on Capsule Network	573
Application of Gradient Boosting Decision Tree in Wind Turbine Drivetrain Recognition	585
Implementation of MD5 Collision Attack in Program	595
Automatic Discovery Mechanism of Blockchain Nodes Based on the Kademlia Algorithm	605
Monochromatic Mutual Nearest Neighbor Queries Over Uncertain Data Yifei Chen, Liling Zhao, and Pengjiang Mei	617
Network-Embedding Based Storage Location Assignment in Mobile Rack Warehouse	630
Efficient PatchMatch-Based Image Registration and Retargeting for Cartoon Animation	640
Author Index	653