

Lecture Notes in Electrical Engineering 1075

Sankita J. Patel  
Naveen Kumar Chaudhary  
Bhavesh N. Gohil  
S. S. Iyengar *Editors*

# Information Security, Privacy and Digital Forensics

Select Proceedings of the International  
Conference, ICISPD 2022



 Springer

# Lecture Notes in Electrical Engineering

## Volume 1075

### Series Editors

Leopoldo Angrisani, Department of Electrical and Information Technologies Engineering, University of Napoli Federico II, Napoli, Italy

Marco Arteaga, Departamento de Control y Robótica, Universidad Nacional Autónoma de México, Coyoacán, Mexico

Samarjit Chakraborty, Fakultät für Elektrotechnik und Informationstechnik, TU München, München, Germany

Jiming Chen, Zhejiang University, Hangzhou, Zhejiang, China

Shanben Chen, School of Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai, China

Tan Kay Chen, Department of Electrical and Computer Engineering, National University of Singapore, Singapore, Singapore

Rüdiger Dillmann, University of Karlsruhe (TH) IAIM, Karlsruhe, Baden-Württemberg, Germany

Haibin Duan, Beijing University of Aeronautics and Astronautics, Beijing, China

Gianluigi Ferrari, Dipartimento di Ingegneria dell'Informazione, Sede Scientifica Università degli Studi di Parma, Parma, Italy

Manuel Ferre, Centre for Automation and Robotics CAR (UPM-CSIC), Universidad Politécnica de Madrid, Madrid, Spain

Faryar Jabbari, Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA, USA

Limin Jia, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China

Janusz Kacprzyk, Intelligent Systems Laboratory, Systems Research Institute, Polish Academy of Sciences, Warsaw, Poland

Alaa Khamis, Department of Mechatronics Engineering, German University in Egypt El Tagamoa El Khames, New Cairo City, Egypt

Torsten Kroeger, Intrinsic Innovation, Mountain View, CA, USA

Yong Li, College of Electrical and Information Engineering, Hunan University, Changsha, Hunan, China

Qilian Liang, Department of Electrical Engineering, University of Texas at Arlington, Arlington, TX, USA

Ferran Martín, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

Tan Cher Ming, College of Engineering, Nanyang Technological University, Singapore, Singapore

Wolfgang Minker, Institute of Information Technology, University of Ulm, Ulm, Germany

Pradeep Misra, Department of Electrical Engineering, Wright State University, Dayton, OH, USA

Subhas Mukhopadhyay, School of Engineering, Macquarie University, NSW, Australia

Cun-Zheng Ning, Department of Electrical Engineering, Arizona State University, Tempe, AZ, USA

Toyoaki Nishida, Department of Intelligence Science and Technology, Kyoto University, Kyoto, Japan

Luca Oneto, Department of Informatics, Bioengineering, Robotics and Systems Engineering, University of Genova, Genova, Genova, Italy

Bijaya Ketan Panigrahi, Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, Delhi, India

Federica Pascucci, Dipartimento di Ingegneria, Università degli Studi Roma Tre, Roma, Italy

Yong Qin, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China

Gan Woon Seng, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, Singapore

Joachim Speidel, Institute of Telecommunications, University of Stuttgart, Stuttgart, Germany

Germano Veiga, FEUP Campus, INESC Porto, Porto, Portugal

Haitao Wu, Academy of Opto-electronics, Chinese Academy of Sciences, Haidian District Beijing, China

Walter Zamboni, Department of Computer Engineering, Electrical Engineering and Applied Mathematics, DIEM—Università degli studi di Salerno, Fisciano, Salerno, Italy

Junjie James Zhang, Charlotte, NC, USA

Kay Chen Tan, Department of Computing, Hong Kong Polytechnic University, Kowloon Tong, Hong Kong

The book series *Lecture Notes in Electrical Engineering* (LNEE) publishes the latest developments in Electrical Engineering—quickly, informally and in high quality. While original research reported in proceedings and monographs has traditionally formed the core of LNEE, we also encourage authors to submit books devoted to supporting student education and professional training in the various fields and applications areas of electrical engineering. The series cover classical and emerging topics concerning:

- Communication Engineering, Information Theory and Networks
- Electronics Engineering and Microelectronics
- Signal, Image and Speech Processing
- Wireless and Mobile Communication
- Circuits and Systems
- Energy Systems, Power Electronics and Electrical Machines
- Electro-optical Engineering
- Instrumentation Engineering
- Avionics Engineering
- Control Systems
- Internet-of-Things and Cybersecurity
- Biomedical Devices, MEMS and NEMS

For general information about this book series, comments or suggestions, please contact [leontina.dicecco@springer.com](mailto:leontina.dicecco@springer.com).

To submit a proposal or request further information, please contact the Publishing Editor in your country:

#### **China**

Jasmine Dou, Editor ([jasmine.dou@springer.com](mailto:jasmine.dou@springer.com))

#### **India, Japan, Rest of Asia**

Swati Meherishi, Editorial Director ([Swati.Meherishi@springer.com](mailto:Swati.Meherishi@springer.com))

#### **Southeast Asia, Australia, New Zealand**

Ramesh Nath Premnath, Editor ([ramesh.premnath@springernature.com](mailto:ramesh.premnath@springernature.com))

#### **USA, Canada**

Michael Luby, Senior Editor ([michael.luby@springer.com](mailto:michael.luby@springer.com))

#### **All other Countries**

Leontina Di Cecco, Senior Editor ([leontina.dicecco@springer.com](mailto:leontina.dicecco@springer.com))

**\*\* This series is indexed by EI Compendex and Scopus databases. \*\***

Sankita J. Patel · Naveen Kumar Chaudhary ·  
Bhavesh N. Gohil · S. S. Iyengar  
Editors

# Information Security, Privacy and Digital Forensics

Select Proceedings of the International  
Conference, ICISPD 2022

 Springer

*Editors*

Sankita J. Patel  
Department of Computer Science  
and Engineering  
Sardar Vallabhbhai National Institute  
of Technology  
Surat, India

Bhavesh N. Gohil  
Department of Computer Science  
and Engineering  
Sardar Vallabhbhai National Institute  
of Technology  
Surat, India

Naveen Kumar Chaudhary  
School of Cyber Security and Digital  
Forensics  
National Forensic Sciences University  
Gujarat, India

S. S. Iyengar  
Florida International University  
Miami, FL, USA

ISSN 1876-1100                      ISSN 1876-1119 (electronic)  
Lecture Notes in Electrical Engineering  
ISBN 978-981-99-5090-4              ISBN 978-981-99-5091-1 (eBook)  
<https://doi.org/10.1007/978-981-99-5091-1>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2024

This work is subject to copyright. All rights are solely and exclusively licensed 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 Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Paper in this product is recyclable.

# Preface

The proceeding presented here comprises the peer-reviewed papers from the International Conference on Information Security, Privacy, and Digital Forensics, 2022. It encompasses an extensive spectrum of themes, incorporating digital forensics, cloud security, privacy, data intelligence, hardware security, network security, blockchain technology, distributed ledger, and others. The volume comprises original contributions and the most recent advancements made by experts in industry and academia, who are active in the domain of security, privacy, and digital forensics, with respect to technological and social aspects. This publication is anticipated to serve as an invaluable reference resource for researchers and academics worldwide.

Surat, India  
Gujarat, India  
Surat, India  
Miami, USA

Sankita J. Patel  
Naveen Kumar Chaudhary  
Bhavesh N. Gohil  
S. S. Iyengar

# Contents

<b>Cybersecurity Resiliency for Airports as a Critical Infrastructure</b> . . . . .	1
Shivendra Anand and Madhavi Dave	
<b>Re-examining Laws Pertaining to Admissibility of Digital Evidence in Investigations</b> . . . . .	17
Kaushik Thinnaneri Ganesan	
<b>Fog Forensics: A Comprehensive Review of Forensic Models for Fog Computing Environment</b> . . . . .	31
Konrad Śniatała, Yashas Hariprasad, K. J. Latesh Kumar, Naveen Kumar Chaudhary, and Michał Weissenberg	
<b>Memory Forensics for Artefacts Recovery from Ether Transactions</b> . . . . .	43
Borase Bhushan Gulabrao, Digvijaysinh Rathod, and Aishwarya Tiwari	
<b>A Lightweight Intrusion Detection and Electricity Theft Detection System for Smart Grid</b> . . . . .	55
Ayush Sinha, Ashutosh Kaushik, Ranjana Vyas, and O. P. Vyas	
<b>Study and Analysis of Key-Predistribution Schemes Based on Hash Chain for WSN</b> . . . . .	69
Kanhaiya Kumar Yadav and Priyanka Ahlawat	
<b>CERT-In New Directives for VPN: A Growing Focus on Mass Surveillance and Data Privacy</b> . . . . .	81
Neeraj Jayant, Naman Nanda, Sushila Madan, and Anamika Gupta	
<b>Addressing DIO Suppression Attack in RPL based IoT Networks</b> . . . . .	91
Rajat Kumar, Jyoti Grover, Girish Sharma, and Abhishek Verma	
<b>Modelling Identity-Based Authentication and Key Exchange Protocol Using the Tamarin Prover</b> . . . . .	107
Srijanee Mookherji, Vanga Odelu, Rajendra Prasath, Alavalapati Goutham Reddy, and Basker Palaniswamy	

<b>Sensor Fusion and Pontryagin Duality</b> .....	123
S. Jayakumar, S. S. Iyengar, and Naveen Kumar Chaudhary	
<b>Lightweight Malicious Packet Classifier for IoT Networks</b> .....	139
Seyedsina Nabavirazavi, S. S. Iyengar, and Naveen Kumar Chaudhary	
<b>Cyber Security Issues and Challenges on Non-fungible Tokens</b> .....	151
N. Kala	
<b>The Rise of Public Wi-Fi and Threats</b> .....	175
Prateek Bheevgade, Chirantan Saha, Rahul Nath, Siddharth Dabhade, Haresh Barot, and S. O. Junare	
<b>Digital Forensic Investigation on Ponzi Schemes</b> .....	191
Babu Madhavan and N. Kalabaskar	
<b>Holistic Cyber Threat Hunting Using Network Traffic Intrusion Detection Analysis for Ransomware Attacks</b> .....	199
Kanti Singh Sangher, Arti Noor, and V. K. Sharma	
<b>Cyber Security Attack Detection Framework for DODAG Control Message Flooding in an IoT Network</b> .....	213
Jerry Miller, Lawrence Egharevba, Yashas Hariprasad, Kumar K. J. Latesh, and Naveen Kumar Chaudhary	
<b>Application of Digital Forensic Evidence in Hit and Run: A Comparative Study with Special Reference to § 304 Part II of IPC</b> ...	231
Hiral Thakar and Manav Kothary	
<b>A Forensic Video Upscaling Colorizing and Denoising Framework for Crime Scene Investigation</b> .....	251
S. Prema and S. Anita	
<b>A Review of Face Detection Anti Spoofing Techniques on Varied Data Sets</b> .....	267
Pratiksha K. Patel and Jignesh B. Patel	
<b>Ethereum Blockchain-Based Medicine Supply Chain</b> .....	279
Jigna J. Hathaliya, Priyanka Sharma, and Sudeep Tanwar	
<b>Machine Learning Algorithms for Attack and Anomaly Detection in IoT</b> .....	291
Rahul Kushwah and Ritu Garg	
<b>A Mini Review on—Physically Unclonable Functions: The Hardware Security Primitives</b> .....	305
Harsh Panchal, Naveen Kumar Chaudhary, and Sandeep Munjal	
<b>An Intelligent Analysis of Mobile Evidence Using Sentimental Analysis</b> .....	317
G. Maria Jones, P. Santhiya, S. Godfrey Winster, and R. Sundar	



**Forensics Analysis of TOR Browser** ..... 331  
Adarsh Kumar, Kumar Sondarva, Bhavesh N. Gohil, Sankita J. Patel,  
Ramya Shah, Sarang Rajvansh, and H. P. Sanghvi

**Phishing Classification Based on Text Content of an Email Body  
Using Transformers** ..... 343  
M. Somesha and Alwyn R. Pais

**Vehicle Theft Detection and Tracking Using Surveillance Video  
for the Modern Traffic Security Management System** ..... 359  
Charanarur Panem, Ashish Kamboj, Naveen Kumar Chaudhary,  
and Lokesh Chouhan

**Resilient Risk-Based Adaptive Authentication and Authorization  
(RAD-AA) Framework** ..... 371  
Jaimandeep Singh, Chintan Patel, and Naveen Kumar Chaudhary

**Survey on Blockchain Scalability Addressing Techniques** ..... 387  
B. S. Anupama and N. R. Sunitha

**Anti-money Laundering Analytics on the Bitcoin Transactions** ..... 405  
Rajendra Hegadi, Bhavya Tripathi, S. Namratha, Aqtar Parveez,  
Animesh Chaturvedi, M. Hariprasad, and P. Priyanga