Communications in Computer and Information Science 625

Commenced Publication in 2007
Founding and Former Series Editors:
Alfredo Cuzzocrea, Dominik Ślęzak, and Xiaokang Yang

Editorial Board

Simone Diniz Junqueira Barbosa
Pontifical Catholic University of Rio de Janeiro (PUC-Rio), Rio de Janeiro, Brazil

Phoebe Chen
La Trobe University, Melbourne, Australia

Xiaoyong Du
Renmin University of China, Beijing, China

Joaquim Filipe
Polytechnic Institute of Setúbal, Setúbal, Portugal

Orhun Kara
TÜBİTAK BİLGEM and Middle East Technical University, Ankara, Turkey

Igor Kotenko
St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, St. Petersburg, Russia

Ting Liu
Harbin Institute of Technology (HIT), Harbin, China

Krishna M. Sivalingam
Indian Institute of Technology Madras, Chennai, India

Takashi Washio
Osaka University, Osaka, Japan

More information about this series at http://www.springer.com/series/7899

Peter Mueller · Sabu M. Thampi
Md. Zakirul Alam Bhuiyan · Ryan Ko
Robin Doss · Jose M. Alcaraz Calero (Eds.)

Security in Computing and Communications

4th International Symposium, SSCC 2016
Jaipur, India, September 21–24, 2016
Proceedings

Springer

Editors
Peter Mueller
IBM Zurich Research Laboratory
Rueschlikon
Switzerland

Sabu M. Thampi
Technology and Management
Indian Institute of Information Technology and Management
Kerala
India

Md. Zakirul Alam Bhuiyan
Temple University
New York, NY
USA

Ryan Ko
Computer Science
University of Waikato
Hamilton
New Zealand

Robin Doss
Deakin University
Burwood, VIC
Australia

Jose M. Alcaraz Calero
University of the West of Scotland
Paisley, Glasgow
UK

ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-981-10-2737-6 ISBN 978-981-10-2738-3 (eBook)
DOI 10.1007/978-981-10-2738-3

Library of Congress Control Number: 2016953330

© Springer Nature Singapore Pte Ltd. 2016
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, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #22-06/08 Gateway East, Singapore 189721, Singapore

Preface

The International Symposium on Security in Computing and Communications (SSCC) aims to provide the most relevant opportunity to bring together researchers and practitioners from both academia and industry to exchange their knowledge and discuss their research findings. The fourth edition, SSCC 2016 was hosted by the LNM Institute of Information Technology (LNMIIT), Jaipur (Rajasthan), India, during September 21–24, 2016. SSCC 2016 was co-located with the First International Conference on Applied Soft Computing and Communication Networks (ACN 2016).

In response to the call for papers, 136 submissions were sent to the symposium. These papers were evaluated on the basis of their significance, novelty, and technical quality. Each paper was reviewed by the members of the Program Committee and finally, 24 regular papers and 16 short papers were accepted.

There is a long list of people who volunteered their time and energy to put together the conference and who warrant acknowledgment. We would like to thank the authors of all the submitted papers, especially the accepted ones, and all the participants who made the symposium a successful event. Thanks to all members of the Technical Program Committee, and the external reviewers, for their hard work in evaluating and discussing papers.

We are grateful to the general chairs and members of the Steering Committee for their support. Our most sincere thanks go to all keynote and tutorial speakers who shared with us their expertise and knowledge. Special thanks to members of the Organizing Committee for their time and effort in organizing the conference.

We wish to express our thanks to Suvira Srivastav, Associate Editorial Director, Computer Science and Publishing Development and Publishing Editor of IAS, Springer India, for her help and cooperation. Finally, we thank Alfred Hofmann and his team at Springer for their excellent support in publishing the proceedings on time.

September 2016

Peter Mueller
Sabu M. Thampi
Md. Zakirul Alam Bhuiyan
Ryan Ko
Robin Doss
Jose M. Alcaraz Calero

Organization

Chief Patron

Lakshmi N. Mittal (Chairman)	LNMIIT, India

Patron

S.S. Gokhale (Director)	LNMIIT, India

General Chairs

Peter Mueller	IBM Zurich Research Laboratory, Switzerland
Sabu M. Thampi	IIITM-Kerala, India

Steering Committee

Ngoc Thanh Nguyen	Wroclaw University of Technology, Poland
Janusz Kacprzyk	Polish Academy of Sciences, Poland
Sankar Kumar Pal	Indian Statistical Institute, India
Hans-Jürgen Zimmermann	RWTH Aachen University, Germany
Nikhil R. Pal	Indian Statistical Institute, India
Sabu M. Thampi	IIITM-K, India
Mario Koeppen	Kyushu Institute of Technology, Japan
Michal Wozniak	Wroclaw University, Poland
Zoran Bojkovic	University of Belgrade, Serbia
Oge Marques	Florida Atlantic University (FAU), USA
Ranjan Gangopadhyay	LNMIIT Jaipur, India
Nabendu Chaki	University of Calcutta, India
Abdennour El Rhalibi	Liverpool John Moores University, UK
Salah Bourennane	Ecole Centrale Marseille, France
Selwyn Piramuthu	University of Florida, USA
Peter Mueller	IBM Zurich Research Laboratory, Switzerland
Robin Doss	Deakin University, Australia
Md. Zakirul Alam Bhuiyan	Temple University, USA
Axel Sikora	University of Applied Sciences Offenburg, Germany
Ryan Ko	University of Waikato, New Zealand
Sri Krishnan	Ryerson University, Toronto, Canada
El-Sayed El-Alfy	King Fahd University of Petroleum and Minerals, Saudi Arabia

Junichi Suzuki	University of Massachusetts Boston, USA
Parag Kulkarni	iknowlation Research Labs Pvt. Ltd., and EKLaT Research, India
Narsi Bolloju	LNMIIT Jaipur, India
Sakthi Balan	LNMIIT Jaipur, India

Organizing Chairs

Raghuvir Tomar	LNMIIT, India
Ravi Prakash Gorthi	LNMIIT, India

Secretariat

Sandeep Saini	LNMIIT, India
Kusum Lata	LNMIIT, India
Subrat Dash	LNMIIT, India

Event Management Chair

Soumitra Debnath	LNMIIT, India

Publicity Co-chair

Santosh Shah	LNMIIT, India

Program Chairs

Md. Zakirul Alam Bhuiyan	Temple University, USA
Ryan Ko	University of Waikato, New Zealand
Robin Doss	School of Information Technology, Deakin University, Australia
Jose M. Alcaraz Calero	University of the West of Scotland, UK

Program Committee/Additional Reviewers

Alireza Abdollahpouri	University of Hamburg, Germany
Mohamad Kasim Abdul Jalil	Universiti Teknologi Malaysia (UTM), Malaysia
Mohammad Faiz Liew Abdullah	Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia
Davide Adami	CNIT Pisa Research Unit, University of Pisa, Italy
Rachit Adhvaryu	Gujarat Technological University, India
Sasan Adibi	Deakin University, Australia
Deepak Aeloor	Shivaji University, India

Alok Aggarwal	JPIET, Meerut, India
S. Agrawal	Delhi Technological University (DTU) Formerly Delhi College of Engineering (DCE), India
Musheer Ahmad	Jamia Millia Islamia, New Delhi, India
Rizwan Ahmed	G.H. Raisoni College of Engineering, Nagpur, India
Maurizio Aiello	National Research Council, CNR-IEIIT, Italy
Syed Taqi Ali	NIT Kurukshetra, India
Saed Alrabaee	Concordia University, Canada
Anitha R.	Anna University, India
Ramalingam Anitha	PSG College of Technology, India
Wolfgang Apolinarski	Locoslab GmbH, Germany
Abdullahi Arabo	University of West England, UK
Knarig Arabshian	Hofstra University, USA
Claudio Ardagna	Università degli Studi di Milano, Italy
Yannis Askoxylakis	FORTH-ICS, Greece
Athira U.	IIITM-K, Trivandrum, India
Asrul Izam Azmi	Universiti Teknologi Malaysia, Malaysia
Ramesh Babu	DSCE, Bangalore, India
Amadou Bagayoko	Institut National Polytechnique Toulouse – ENSEEIHT, France
Achimuthu Balu	Alagappa University, India
Nikolaos Bardis	Hellenic Military Academy, Greece
Carole Bassil	Lebanese University, Lebanon
Saumya Batham	ABES Engineering College, Ghaziabad, India
Ingmar Baumgart	Karlsruhe Institute of Technology (KIT), Germany
Yosra Ben Mustapha	Allianz, France
Salah Benbrahim	Ecole Polytechnique, Canada
Bruhadeshwar Bezawada	Koneru Lakshmaiah University, India
Pawan Bhandari	Intel, India
Bharat Bhargava	Purdue Unive, USA
Debojyoti Bhattacharya	Robert Bosch Engineering and Business Soluions Limited, India
Tapalina Bhattasali	University of Calcutta, India
Nidhal Bouaynaya	Rowan University, USA
Karima Boudaoud	University of Nice Sophia Antipolis, France
Christos Bouras	University of Patras CTI and P-Diophantus, Greece
Kai Bu	Zhejiang University, P.R. China
John Buford	Avaya Labs Research, USA
Christian Callegari	RaSS National Laboratory, CNIT, Italy
Enrico Cambiaso	National Research Council, CNR-IEIIT, Italy
Zhenfu Cao	Shanghai Jiao Tong University, P.R. China
Xianghui Cao	Southeast University, P.R. China
Xiaolin Chang	Beijing Jiaotong University, P.R. China
Chin-Chen Chang	Feng Chia University, Taiwan
Madhumita Chatterjee	Pillai Institute of Information Technology, India
Santanu Chatterjee	Research Center Imarat, India

Ankit Chaudhary	Truman State University, USA
Himanshu Chaurasiya	Amity School of Engineering and Technology, India
Mahesh Chavan	KIT's College of Engineering, India
Thomas Chen	City University London, UK
Yuanfang Chen	Guangdong University of Petrochemical Technology, P.R. China
Young-Long Chen	National Taichung University of Science and Technology, Taiwan
Xiaofei Cheng	Institute for Infocomm Research, Singapore
Chien-Fu Cheng	Tamkang University, Taiwan
Feng Cheng	University of Potsdam, Germany
Deepak Choudhary	LPU, India
Maxwell Christian	Gujarat Technological University, India
Chung-Hua Chu	National Taichung Institute of Technology, Taiwan
Phan Cong-Vinh	NTT University, Vietnam
Mauro Conti	University of Padua, Italy
Juan Corchado	Universidad de Salamanca, Spain
Joni Da Silva Fraga	UFSC, Brazil
Tasos Dagiuklas	London South Bank University, UK
Anil Dahiya	Manipal University Jaipur, India
Saad Darwish	University of Alexandria, Egypt
Anjana P. Das	College of Engineering, Trivandrum, India
Ashok Kumar Das	International Institute of Information Technology, Hyderabad, India
Pratish Datta	Indian Institute of Technology, Kharagpur, India
Sabrina De Capitani di Vimercati	Università degli Studi di Milano, Italy
Herve Debar	Télécom SudParis, France
Deepthi P.P.	NIT Calicut, India
Abdelouahid Derhab	King Saud University, Saudi Arabia
Aaradhana Deshmukh	Aalborg University Denamrk, India
Dipayan Dev	National Institute of Technology, Silchar, India
Yamuna Devi	VTU, Belagavi, India
Andreas Dewald	ERNW Research GmbH, Germany
Nilanjan Dey	West Bengal University of Technology, India
Vydeki Dharmar	Easwari Engineering College, India
Gianluca Dini	University of Pisa, Italy
Saurabh Dixit	Babu Banarsi Das University, Lucknow, India
Chawki Djeddi	University of Tebessa, Algeria
Nikunj Domadiya	S.V. National Institute of Technology, Surat (Gujarat), India
Jignesh Doshi	L.J. Institute of Management Studies, Ahmedabad, India
Manali Dubal	University of Pune, India
Ha Duyen Trung	Hanoi University of Science and Technology, Vietnam
Amit Dvir	Ariel University Center of Samaria, Israel

El-Sayed El-Alfy	King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia
Chun-I Fan	National Sun Yat-sen University, Taiwan
Pingyi Fan	Tsinghua University, P.R. China
Eduardo Fernandez	Florida Atlantic University, USA
Ed' Wilson Ferreira	Federal Institute of Mato Grosso, Brazil
Mathias Fischer	University of Münster, Germany
Simon Fong	University of Macau, Macau, SAR China
Sara Foresti	Università degli Studi di Milano, Italy
Apostolos Fournaris	University of Patras, Greece
Thomas Gamer	ABB AG, Germany
Carlos Gañán	Delft University of Technology, The Netherlands
Dariusz Gasior	Wroclaw University of Technology, Poland
S. Geetha	VIT University, India
Geethakumari G	BITS-Pilani, Hyderabad Campus, India
Vadivelou Gnanapragasam	Pondicherry University, India
Kandaswamy Gokulnath	Anna University, India
Mario Goldenbaum	Princeton University, USA
Paulo Gondim	Universidade de Brasilia, Brazil
Gopinath V.	Sathyabama University, India
R. Goudar	Graphic Era University, India
Rahul Goyal	Amrita School of Engineering, India
Stefanos Gritzalis	University of the Aegean, Greece
Sghaier Guizani	Alfaisal University, Saudi Arabia
Manish Gupta	Hindustan Institute of Technology and Management, Agra, India
Ankur Gupta	Model Institute of Engineering and Technology, India
Hani Hamdan	SUPELEC, France
Ramesh Hansdah	Indian Institute of Science, Bangalore, India
E. Hari Krishna	KU College of Engineering and Technology, India
Harikrishnan K.	Amrita Vishwa Vidyapeetham, India
Houcine Hassan	Universidad Politecnica de Valencia, Spain
Wolfgang Hommel	Universität der Bundeswehr München, Germany
Tzung-Pei Hong	National University of Kaohsiung, Taiwan
Gwo-Jiun Horng	Southern Taiwan University of Science and Technology, Taiwan
Jiankun Hu	University of New South Wales, Australia
Chun-Chieh Huang	Industrial Technology Research Institute, Taiwan
Zequn Huang	University of Delaware, USA
Benoit Hudzia	SAP Research, UK
Mohamed Hussien	Misr University for Science and Technology, Egypt
Luigi Lo Iacono	Cologne University of Applied Sciences, Germany
Alfonso Iacovazzi	Singapore University of Technology and Design, Singapore
Athirai A. Irissappane	Nanyang Technological University, Singapore

Komal Balasubramanian Priya Iyer	Sathyabama University, India
Xiaoqi Jia	Institute of Information Engineering, Chinese Academy of Sciences, P.R. China
Jilna P.	National Institute of Technology, Calicut, India
Deveshkumar Jinwala	S.V. National Institute of Technology, India
Shreenivas Jog	Govt. College of Engineering Pune, University of Pune, India
Eduard Jorswieck	TU Dresden, Germany
Manisha Joshi	MGM College of Engineering, India
Jyothish G.	Centre for Computational Engineering and Networking, India
Kamatchi R.	Amity University, Mumbai, India
Georgios Kambourakis	University of the Aegean, Greece
S. Kami Makki	Lamar University, USA
Jayaprakash Kar	King Abdulaziz University, Saudi Arabia
Nirmalya Kar	National Institute of Technology Agartala, India
Sahil Kataria	Govt. Engineering College of Bikaner, India
Sokratis Katsikas	Norwegian University of Science and Technology, Norway
Kuljeet Kaur	TechNivarana Centre for Technical Learning, India
Al-Sakib Khan Pathan	Southeast University, Bangladesh
Muhammad Imran Khan	University of Toulouse, France
Harmeet Khanuja	University of Pune, India
Mahmoud Khasawneh	Concordia University, Canada
Gaurav Khatwani	Indian Institute of Management, Rohtak, India
Donghyun Kim	Kennesaw State University, USA
Kwangjo Kim	Korea Advanced Institute of Science and Technology, Korea
Kirubakaran R.	Kumaraguru College of Technology, India
Ravi Kodali	National Institute of Technology, Warangal, India
Grzegorz Kolaczek	Wroclaw University of Technology, Poland
Nikos Komninos	City University London, UK
Jerzy Konorski	Gdansk University of Technology, Poland
Zbigniew Kotulski	Warsaw University of Technology, Poland
Dimitrios Koukopoulos	University of Patras, Greece
Adrianna Kozierkiewicz-Hetmańska	Wrocław University of Technology, Poland
Deepa Krishnan	Pillai Institute of Information Technology, India
Dilip Krishnaswamy	IBM Research, India
Tarun Kumar	Govt. Engineering College of Bikaner, India
Adarsh Kumar	JIIT, Noida, India
Binod Kumar	JSPM's Jayawant Institute of Computer Applications, Pune, India
Raghvendra Kumar	LNCT Group of College, India
Sanjeev Kumar	University of Texas, RGV, USA

Jeril Kuriakose	St. John College of Engineering, India
Thomas Lagkas	The University of Sheffield International Faculty, CITY College, Greece
Yuan-Cheng Lai	Information Management, NTUST, Taiwan
Costas Lambrinoudakis	University of Piraeus, Greece
Peter Langendoerfer	IHP Microelectronics, Germany
Michael Lauer	Michael Lauer Information Technology, Germany
Ruidong Li	National Institute of Information and Communications Technology (NICT), Japan
Fengjun Li	The University of Kansas, USA
Jia-Chin Lin	National Central University, Taiwan
Yibei Ling	Telcordia Technologies, USA
Anyi Liu	Purdue University Fort Wayne, USA
Guilu Long	Tsinghua University, P.R. China
Pascal Lorenz	University of Haute Alsace, France
Rongxing Lu	Nanyang Technological University, Singapore
Yuan Luo	Shanghai Jiao Tong University, P.R. China
Wenjian Luo	University of Science and Technology of China, P.R. China
S.D. Madhu Kumar	National Institute of Technology Calicut, India
Parikshit Mahalle	Smt. Kashibai Navale College of Engineering, Pune, India
Eman Mahmoodi	Stevens Institute of Technology, USA
Soumyadev Maity	National Institute of Technology, Rourkela, India
Amrita Manjrekar	Shivaji University, India
Marius Marcu	Politehnica University of Timisoara, Romania
Sjouke Mauw	University of Luxembourg, Luxembourg
Chandan Mazumdar	Jadavpur University, India
Michael McGuire	University of Victoria, Canada
Prashant Menghal	MCEME, India
Philippe Merle	Inria Lille – Nord Europe, France
Nader Mir	San Jose State University, USA
Dheerendra Mishra	Indian Institute of Technology, Kharagpur, India
Punit Mittal	ABV-IIITM, India
Jose Molina	Universidad Carlos III de Madrid, Spain
Edward Moreno	UFS – Federal University of Sergipe, Brazil
Saswati Mukherjee	Anna University, India
Skanda Muthaiah	Trimble Navigation, USA
Nagaraja B.	Visvesvaraya Technological University, India
Aravind Nair	Amrita University, India
Ashok Nanda	B.V. Raju Institute of Technology, India
Geetika Narang	SIT College, India
Pratiksha Natani	DIAT, India
Quamar Niyaz	University of Toledo, USA
Andreas Noack	University of Applied Sciences Stralsund, Germany
Kenneth Nwizege	Ken Saro-Wiwa Polytechnic, Bori, Nigeria

Gabriele Oligeri	Third University of Rome, Italy
Alexis Olivereau	CEA, LIST, France
Jose A. Onieva	University of Malaga, Spain
Rolf Oppliger	eSECURITY Technologies, Switzerland
Michele Pagano	University of Pisa, Italy
Anala Pandit	Veermata Jijabai Technological Institute, India
Mauricio Papa	The University of Tulsa, USA
Gianluca Papaleo	National Research Council, CNR-IEIIT, Italy
Alex Pappachen James	Nazarbayev University, Kazakhstan
Stefano Paraboschi	University of Bergamo, Italy
Abhishek Parakh	University of Nebraska at Omaha, USA
Keyurkumar Patel	Australian Defence Force, Australia
Prakashgoud Patil	B.V. Bhoomaraddi College of Engineering and Technology, India
Vaibhav Patil	Shivaji University, India
Thomas Paul	TU Darmstadt, Germany
Vishnu Pendyala	Santa Clara University, USA
Antonio Pescapé	University of Naples Federico II, Italy
Dennis Pfisterer	University of Lübeck, Germany
Simon Pietro Romano	University of Naples Federico II, Italy
Anitha Pillai	Hindustan University, Chennai, India
Vincenzo Piuri	Università degli Studi di Milano, Italy
Geong-Sen Poh	MIMOS, Malaysia
Prabaharan Poornachandran	Amrita Vishwa Vidyapeetham, Amrita University, India
Digambar Povar	BITS Pilani Hyderabad, India
Sudir Prakash	VTU, India
Neeli Prasad	Center for TeleInFrastructure (CTIF), USA
Anand Prasad	NEC Corporation, Japan
Prathap C.	PESIT, Bangalore, India
Praveen K.	Amrita Vishwa Vidyapeetham, India
Guangzhi Qu	Oakland University, USA
Kester Quist-Aphetsi	University of Brest, France
Giuseppe Raffa	Intel Corporation, USA
Rajan A.	Tata Consultancy Services, India
Rajaram S.	TCE Madurai, India
Rajesh J.	VIT University, India
Venkat Raman	JNTU, India
Karthikeyan Ramasamy	Teclever Solutions Pvt. Ltd., India
Tarun Rao	Dayanand Sagar College of Engineering, India
Sherif Rashad	Florida Polytechnic University, USA
Nadana Ravishankar	B.S. Abdur Rahman University, India
Sanjay Rawat	IIIT Hyderabad, India
Slim Rekhis	University of Carthage, Tunisia
Remya Ajai A.S.	Amrita Vishwa Vidyapeetham, India
Eric Renault	Institut Mines-Telecom – Telecom SudParis, France

Vincent Roca	Inria Rhône-Alpes, France
Roberto Rojas-Cessa	New Jersey Institute of Technology, USA
Sohini Roy	Arizona State University, USA
Animesh Roy	Indian Institute of Engineering Science and Technology, Shibpur, India
Diptendu Sinha Roy	National Institute of Science and Technology, Berhampur, India
Giuseppe Ruggeri	University of Reggio Calabria, Italy
Antonio Ruiz-Martínez	University of Murcia, Spain
Jorge Sá Silva	University of Coimbra, Portugal
Amit Sachan	Samsung Research Institute-Noida, India
Navanath Saharia	Gheorghe Asachi Technical University of Iasi, Romania
Youssef Said	Tunisie Telecom, Tunisia
Bhavna Saini	Manipal University Jaipur, India
Samir Saklikar	Cisco, India
Panagiotis Sarigiannidis	University of Western Macedonia, Greece
Himangshu Sarma	University of Bremen, Germany
Mrudula Sarvabhatla	NBKR IST, India
Alka Sawlikar	Nagpur University, India
Rajat Saxena	Indian Institute of Technology, Indore, India
Ulrich Schoen	Self-employed, Germany
Jan Seedorf	HFT Stuttgart, Germany
Debajit Sensarma	University of Calcutta, India
Veerasamy Senthil	Thiagarajar School of Management, India
Bartomeu Serra	Universitat de les Illes Balears, Spain
Pritam Shah	JIT, Bangalore, India
Jagruti Shah	Nagpur University, India
Hamid Sharif	University of Nebraska-Lincoln, USA
Shivani Sharma	ABES-EC, Ghaziabad, India
Yatendra Sharma	Arya College of Engineering Technology and Management, India
Anu Sharma	Chandigarh University, India
Amita Sharma	I. I. S. University, India
Aditi Sharma	MBM Engineering College Jodhpur, India
Sandip Shinde	Pune University, India
Preeti Shivach	Gurukul Kangri Vishwavidyalaya Haridwar, India
Rajeev Shrivastava	MPSIDC, India
Piyush Shukla	UIT RGPV, India
Sabrina Sicari	University of Insubria, Italy
Vikas Sihag	Central University of Rajasthan, India
Axel Sikora	University of Applied Sciences Offenburg, Germany
Sindhu M.	Amrita Vishwa Vidyapeetham, India
Rajiv Singh	Banasthali University, India
Kunwar Singh	NIT Trichy, India
Sarbjeet Singh	Panjab University, Chandigarh, India

Somayaji Siva Rama Krishnan	VIT University, India
Nicolas Sklavos	University of Patras, Greece
Vaclav Snasel	VSB-Technical University of Ostrava, FEECS, Czech Republic
Vikas Solanke	MSBTE, India
Karthik Srinivasan	Philips, India
Maicon Stihler	Federal Center for Technological Education – CEFET-MG, Brazil
Dimitrios Stratogiannis	National Technical University of Athens, Greece
Martin Strohmeier	University of Oxford, UK
Ravi Subban	Pondicherry University, Pondicherry, India
Muthukumar Subramanyam	Indian Institute of Information Technology, Tamilnadu, India
Sudarshan T.S.B.	Amrita Vishwa Vidyapeetham University, India
Suganya R.	Thiagarajar College of Engineering, India
Venkatasamy Sureshkumar	PSG College of Technology, India
Pawel Szalachowski	ETH Zurich, Switzerland
Cristina Alcaraz Tello	University of Malaga, Spain
Clement Temaneh-Nyah	University of Namibia, Namibia
Appala Naidu Tentu	CR Rao AIMSCS, India
Deepti Theng	G.H. Raisoni College of Engineering, India
Ciza Thomas	College of Engineering Trivandrum, India
Sandeep Thorat	Shivaji University, India
Padmaja Thurumella	K.L. University, Vaddeswaram, India
Harshvardhan Tiwari	SET, Jain University, India
Orazio Tomarchio	University of Catania, Italy
Zouheir Trabelsi	UAE University, United Arab Emirates
Hardik Upadhyay	GTU, India
Vallikannu R.	Hindustan University, Under UGC Act 3, India
Odelu Vanga	Indian Institute of Information Technology Chittoor, India
Anitha Varghese	ABB Research, India
Varsha Varute	Shivaji University, India
Emmanouel Varvarigos	University of Patras and Computer Technology Institute, Greece
Divya Vidyadharan	College of Engineering, Trivandrum, India
S Vijaykumar	6TH SENSE, An Advanced Research and Scientific Experiment Foundation, India
Vikram Raju R.	Manipal University Jaipur, India
Javier García Villalba	Universidad Complutense de Madrid, Spain
Vinod Chandra S.S.	University of Kerala, India
Chandra Vorugunti	Indian Institute of Information Technology, SriCity, India
Yong Wang	Dakota State University, USA
Qi Wang	University of the West of Scotland, UK

Shah Jahan Wani	University of Kashmir, India
Mohammad Wazid	IIIT, Hyderabad, India
Chih-Yu Wen	National Chung Hsing University, Taiwan
Andreas Wespi	IBM Zurich Research Laboratory, Switzerland
Carlos Becker Westphall	Federal University of Santa Catarina, Brazil
Setyawan Widyarto	Universiti Selangor, Malaysia
Marcus Wong	Huawei Technologies, USA
Bing Wu	Fayetteville State University, USA
Jun Wu	Shanghai Jiao Tong University, P.R. China
Liang Xiao	Xiamen University, P.R. China
Jiping Xiong	Zhejiang Normal University, P.R. China
Yurong Xu	Dartmouth College, USA
Kunjie Xu	Ericsson R&D, Silicon Valley, USA
Akihiro Yamamura	Akita University, Japan
Ping Yang	Binghamton University, USA
Chang Wu Yu	Chung Hua University, Taiwan
Meng Yu	University of Texas at San Antonio, USA
Dmitry Zaitsev	International Humanitarian University, Ukraine
Tao Zhang	Chinese University of Hong Kong, SAR China
Jianhong Zhang	North China University of Technology, P.R. China
Wuxiong Zhang	Shanghai Research Center for Wireless Communications, P.R. China
Haijun Zhang	The University of British Columbia, Canada
Mohamed Faten Zhani	École de Technologie Supérieure, University of Quebec, Canada
Kai Zheng, 2012 Labs	Huawei Technologies, P.R. China
Liang Zhou	Nanjing University of Posts and Telecommunications, P.R. China
Bo Zhu	Google Inc., Canada

Contents

Cryptosystems, Algorithms, Primitives

Computing Mod with a Variable Lookup Table 3
Mark A. Will and Ryan K.L. Ko

Mutual Authentication Based on HECC for RFID Implant Systems 18
Asha Liza John and Sabu M. Thampi

On the Use of Asynchronous Cellular Automata in Symmetric-Key Cryptography 30
Biswanath Sethi and Sukanta Das

A Random Key Generation Scheme Using Primitive Polynomials over GF(2) 42
Inderjeet Singh and Alwyn R. Pais

Multi-factor Authentication Using Recursive XOR-Based Visual Cryptography in Online Voting System 52
P. Sanyasi Naidu and Reena Kharat

Enhanced Image Based Authentication with Secure Key Exchange Mechanism Using ECC in Cloud 63
Anurag Singh Tomar, Shashi Kant Shankar, Manmohan Sharma, and Aditya Bakshi

Differential Fault Analysis on Tiaoxin and AEGIS Family of Ciphers 74
Prakash Dey, Raghvendra Singh Rohit, Santanu Sarkar, and Avishek Adhikari

A Comparison of Diffusion Properties of Salsa, ChaCha, and MCC Core 87
Rajeev Sobti and G. Geetha

A Secure Keyword Ordered Multiuser Searchable Encryption Framework . . . 99
Kulvaibhav Kaushik and Vijayaraghavan Varadharajan

Cryptographic Assessment of SSL/TLS Servers Popular in India 112
Prakhar Jain and K.K. Shukla

Key Identifications Using Hebbian Learning 124
Bhavya Ishaan Murmu, Anu Kumari, Manu Malkani, and Sanjeet Kumar

Security and Privacy in Networked Systems

An Automated Methodology for Secured User Allocation in Cloud 137
Srijita Basu, Anirban Sengupta, and Chandan Mazumdar

Provenance-Aware NoSQL Databases 152
Anu Mary Chacko, Munavar Fairooz, and S.D. Madhu Kumar

Efficient Key Management in IoT Using Mobile Aggregator 161
Sumit Saurabh, Alwyn R. Pais, and Sumanta Chatterjee

Cloud Resources Optimization for Air Pollution Monitoring Devices and Avoiding Post Pillar Problem 173
Parampreet Singh and Pankaj Deep Kaur

Credibility Assessment of Public Pages over Facebook 188
Himanshi Agrawal and Rishabh Kaushal

Elliptic Curve Based Secure Outsourced Computation in Multi-party Cloud Environment 199
V. Thangam and K. Chandrasekaran

Secure and Privacy Preserving Mobile Healthcare Data Exchange Using Cloud Service 213
Doyel Pal, Gobinda Senchury, and Praveenkumar Khethavath

Secure Certificateless Signature Scheme with Batch Verification from Bilinear Pairings 225
N.B. Gayathri and P. Vasudeva Reddy

System and Network Security

Security Requirements Elicitation and Modeling Authorizations 239
Rajat Goel, Mahesh Chandra Govil, and Girdhari Singh

Two Level Signature Based Authorization Model for Secure Data Warehouse 251
Anjana Gosain and Amar Arora

Nonlinear Tracking of Target Submarine Using Extended Kalman Filter (EKF) 258
S. Vikranth, P. Sudheesh, and M. Jayakumar

Tracking Inbound Enemy Missile for Interception from Target Aircraft Using Extended Kalman Filter 269
T.S. Gokkul Nath, P. Sudheesh, and M. Jayakumar

Steganography/Visual Cryptography/Image Forensics

A Secure One-Time Password Authentication Scheme Using Image Texture Features 283
Maitreya Maity, Dhiraj Manohar Dhane, Tushar Mungle, Rupak Chakraborty, Vasant Deokamble, and Chandan Chakraborty

Analyzing the Applicability of Bitsum Algorithm on LSB Steganography Technique 295
Bagga Amandeep and G. Geetha

Extreme Learning Machine for Semi-blind Grayscale Image Watermarking in DWT Domain 305
Ankit Rajpal, Anurag Mishra, and Rajni Bala

A Passive Blind Approach for Image Splicing Detection Based on DWT and LBP Histograms 318
Mandeep Kaur and Savita Gupta

An Image Forensic Technique for Detection of Copy-Move Forgery in Digital Image 328
Ashwini Malviya and Siddharth Ladhake

Secure Authentication in Online Voting System Using Multiple Image Secret Sharing 336
P. Sanyasi Naidu and Reena Kharat

Applications Security

Touch and Track: An Anti-theft and Data Protection Technique for Smartphones 347
Sohini Roy, Arvind Kumar Shah, and Uma Bhattacharya

Enhancement of Detecting Wicked Website Through Intelligent Methods 358
Tarik A. Rashid and Salwa O. Mohamad

Prediction of Malicious Domains Using Smith Waterman Algorithm 369
B. Ashwini, Vijay Krishna Menon, and K.P. Soman

Outsource-Secured Calculation of Closest Pair of Points 377
Chandrasekhar Kuruba, Kethzi Gilbert, Prabhav Sidhaye, Gaurav Pareek, and Purushothama Byrapura Rangappa

Discovering Vulnerable Functions: A Code Similarity Based Approach 390
Aditya Chandran, Lokesh Jain, Sanjay Rawat, and Kannan Srinathan

Performance Analysis of Spectrum Sensing Algorithm Using Multiple Antenna in Cognitive Radio 403
Komal Pawar and Tanuja Dhope

Diagnosis of Multiple Stuck-at Faults Using Fault Element Graph with Reduced Power 414
T.S. Gokkul Nath, E.R. Midhila, Ashwin Swaminathan, Binitaa Lekshmi, and J.P. Anita

Intrusion Detection Using Improved Decision Tree Algorithm with Binary and Quad Split 427
Shubha Puthran and Ketan Shah

MalJs: Lexical, Structural and Behavioral Analysis of Malicious JavaScripts Using Ensemble Classifier 439
Surendran K., Prabaharan Poornachandran, Aravind Ashok Nair, Srinath N., Ysudhir Kumar, and Hrudya P.

SocialBot: Behavioral Analysis and Detection. 450
Madhuri Dewangan and Rishabh Kaushal

Vulnebdroid: Automated Vulnerability Score Calculator for Android Applications 461
Sugandha Gupta and Rishabh Kaushal

Author Index 473