Lecture Notes on Data Engineering and Communications Technologies

Volume 29

Series editor

Fatos Xhafa, Technical University of Catalonia, Barcelona, Spain
e-mail: fatos@cs.upc.edu

The aim of the book series is to present cutting edge engineering approaches to data technologies and communications. It will publish latest advances on the engineering task of building and deploying distributed, scalable and reliable data infrastructures and communication systems.
The series will have a prominent applied focus on data technologies and communications with aim to promote the bridging from fundamental research on data science and networking to data engineering and communications that lead to industry products, business knowledge and standardisation.

More information about this series at http://www.springer.com/series/15362

Leonard Barolli · Fatos Xhafa ·
Zahoor Ali Khan · Hamad Odhabi
Editors

Advances in Internet, Data and Web Technologies

The 7th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2019)

Springer

Editors
Leonard Barolli
Department of Information
and Communication Engineering,
Faculty of Information Engineering
Fukuoka Institute of Technology
Fukuoka, Japan

Fatos Xhafa
Technical University of Catalonia
Barcelona, Spain

Zahoor Ali Khan
Computer Information Science (CIS)
Higher Colleges of Technology,
Fujairah Campus
Fujairah, United Arab Emirates

Hamad Odhabi
Faculty of Computer Information Science
Higher Colleges of Technology,
Dubai Campus
Dubai, United Arab Emirates

ISSN 2367-4512 ISSN 2367-4520 (electronic)
Lecture Notes on Data Engineering and Communications Technologies
ISBN 978-3-030-12838-8 ISBN 978-3-030-12839-5 (eBook)
https://doi.org/10.1007/978-3-030-12839-5

Library of Congress Control Number: 2019930656

© 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, express 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

Welcome Message of EIDWT-2019 International Conference Organizers

Welcome to the 7th International Conference on Emerging Internet, Data and Web Technologies (EIDWT-2019), which will be held from February 26 to February 28, 2019, at Higher Colleges of Technology, Fujairah Campus, United Arab Emirates (UAE).

EIDWT is dedicated to the dissemination of original contributions that are related to the theories, practices and concepts of emerging Internet and data technologies yet most importantly of their applicability in business and academia toward a collective intelligence approach.

In EIDWT-2019 will be discussed the topics related to Information Networking, Data Centers, Data Grids, Clouds, Crowds, Mashups, Social Networks, Security Issues and other Web 2.0 implementations toward a collaborative and collective intelligence approach leading to advancements of virtual organizations and their user communities. This is because current and future Web and Web 2.0 implementations will store and continuously produce a vast amount of data, which if combined and analyzed through a collective intelligence manner will make a difference in the organizational settings and their user communities. Thus, the scope of EIDWT-2019 includes methods and practices which bring various emerging Internet and data technologies together to capture, integrate, analyze, mine, annotate and visualize data in a meaningful and collaborative manner. Finally, EIDWT-2019 aims to provide a forum for original discussion and prompt future directions in the area. For EIDWT-2019 International Conference, we accepted for presentation 52 papers (about 30% acceptance ratio).

An international conference requires the support and help of many people. A lot of people have helped and worked hard for a successful EIDWT-2019 technical program and conference proceedings. First, we would like to thank all authors for submitting their papers. We are indebted to Program Area Chairs, Program Committee Members and Reviewers who carried out the most difficult work of carefully evaluating the submitted papers. We would like to give our special thanks to Honorary Co-Chairs of EIDWT-2019, for their guidance and support. We would like to express our appreciation to our keynote speakers for accepting our invitation and delivering very interesting keynotes at the conference.

We would like as well to thank the Local Arrangements Chairs for making excellent local arrangements for the conference. We hope you will enjoy the conference and have a great time in Fujairah, UAE.

EIDWT-2019 International Conference Organizers

EIDWT-2019 Steering Committee Co-chairs

Leonard Barolli	Fukuoka Institute of Technology (FIT), Japan
Fatos Xhafa	Technical University of Catalonia, Spain

EIDWT-2019 General Co-chairs

Nasser Nassiri	Higher Colleges of Technology, UAE
Tomoya Enokido	Rissho University, Japan
Zahoor Khan	Higher Colleges of Technology, UAE

EIDWT-2019 Program Committee Co-chairs

Saif Alqaydi	Higher Colleges of Technology, UAE
Juggapong Natwichai	Chiang Mai University, Thailand
Nadeem Javaid	COMSATS Institute of IT, Pakistan

EIDWT-2019 Organizing Committee

Honorary Co-chairs

Khaled Alhammadi	Higher Colleges of Technology, UAE
Makoto Takizawa	Hosei University, Japan
Hamad Odhabi	Higher Colleges of Technology, UAE

General Co-chairs

Nasser Nassiri	Higher Colleges of Technology, UAE
Tomoya Enokido	Rissho University, Japan
Zahoor Khan	Higher Colleges of Technology, UAE

Program Co-chairs

Saif Alqaydi	Higher Colleges of Technology, UAE
Juggapong Natwichai	Chiang Mai University, Thailand
Nadeem Javaid	COMSATS Institute of IT, Pakistan

International Advisory Committee

Adel Zairi	Higher Colleges of Technology, UAE
Janusz Kacprzyk	Polish Academy of Sciences, Poland
Vincenzo Loia	University of Salerno, Italy
Arjan Durresi	IUPUI, USA
Hiroaki Nishino	Oita University, Japan

Publicity Co-chairs

Santi Caballé	Open University of Catalonia, Spain
Pruet Boonma	Chiang Mai University, Thailand
Elis Kulla	Okayama University of Science, Japan
Farookh Hussain	University of Technology Sydney, Australia

International Liaison Co-chairs

Ossama Embarak	Higher Colleges of Technology, UAE
Flora Amato	Naples University Frederico II, Italy
Admir Barolli	Alexander Moisiu University of Durres, Albania
Omar Hussain	University of New South Wales, Australia
Akio Koyama	Yamagata University, Japan

Local Organizing Co-chairs

Mona Almteiri	Higher Colleges of Technology, UAE
Ivana Ercegovac	Higher Colleges of Technology, UAE

Web Administrators

Donald Elmazi	Fukuoka Institute of Technology (FIT), Japan
Yi Liu	Fukuoka Institute of Technology (FIT), Japan
Miralda Cuka	Fukuoka Institute of Technology (FIT), Japan

Finance Chair

Makoto Ikeda	Fukuoka Institute of Technology (FIT), Japan

Steering Committee Co-chairs

Leonard Barolli	Fukuoka Institute of Technology (FIT), Japan
Fatos Xhafa	Technical University of Catalonia, Spain

Program Committee Members

Akimitsu Kanzaki	Shimane University, Japan
Akio Koyama	Yamagata University, Japan
Akira Uejima	Okayama University of Science, Japan
Akshay Uttama Nambi S. N.	Microsoft Research, India
Alba Amato	National Research Council (CNR), Italy

Alberto Scionti	ISMB, Italy
Albin Ahmeti	TU Wien, Austria
Alex Pongpech	National Institute of Development Administration, Thailand
Ali Rodan	Higher Colleges of Technology, UAE
Alfred Miller	Higher Colleges of Technology, UAE
Amelie Chi Zhou	Shenzhen University, China
Amin M. Khan	Pentaho, Hitachi Data Systems, Japan
Ana Azevedo	ISCAP, Portugal
Andrea Araldo	Massachusetts Institute of Technology, USA
Animesh Dutta	National Institute of Technology, Durgapur, India
Anirban Mondal	Shiv Nadar University, India
Anis Yazidi	Oslo and Akershus University College of Applied Sciences, Norway
Antonella Di Stefano	University of Catania, Italy
Arcangelo Castiglione	University of Salerno, Italy
Beniamino Di Martino	Università della Campania "Luigi Vanvitelli", Italy
Benson Raj	Higher Colleges of Technology, UAE
Bhed Bista	Iwate Prefectural University, Japan
Bowonsak Srisungsittisunti	University of Phayao, Thailand
Carmen de Maio	University of Salerno, Italy
Chang Yung-Chun	Taipei Medical University, Italy
Chonho Lee	Osaka University, Japan
Chotipat Pornavalai	King Mongkut's Institute of Technology Ladkrabang, Thailand
Christoph Hochreiner	TU Wien, Austria
Congduc Pham	University of Pau, France
Dalvan Griebler	Pontifícia Universidade Católica do Rio Grande do Sul, Brazil
Dana Petcu	West University of Timisoara, Romania
Danda B. Rawat	Howard University, USA
Debashis Nandi	National Institute of Technology, Durgapur, India
Diego Kreutz	Universidade Federal do Pampa, Brazil
Dimitri Pertin	Inria Nantes, France
Dipankar Das	Jadavpur University, Kolkata, India
Douglas D. J. de Macedo	Federal University of Santa Catarina, Brasil
Dumitru Burdescu	University of Craiova, Romania
Dusit Niyato	NTU, Singapore
Elis Kulla	Okayama University of Science, Japan
Eric Pardede	La Trobe University, Australia
Fabrizio Marozzo	University of Calabria, Italy
Fabrizio Messina	University of Catania, Italy
Farookh Hussain	University of Technology Sydney, Australia
Feng Xia	Dalian University of Technology, China

Francesco Orciuoli	University of Salerno, Italy
Francesco Palmieri	University of Salerno, Italy
Fumiaki Sato	Toho University, Japan
Gabriele Mencagli	University of Pisa, Italy
Gen Kitagata	Tohoku University, Japan
Ghazi Ben Ayed	Higher Colleges of Technology, UAE
Georgios Kontonatsios	Edge Hill University, UK
Giovanni Masala	Plymouth University, UK
Giovanni Morana	C3DNA, USA
Giuseppe Caragnano	ISMB, Italy
Giuseppe Fenza	University of Salerno, Italy
Gongjun Yan	University of Southern Indiana, USA
Guangquan Xu	Tianjin University, China
Gustavo Medeiros de Araujo	Universidade Federal de Santa Catarina, Brazil
Harold Castro	Universidad de Los Andes, Colombia
Hiroaki Nishino	Oita University, Japan
Hiroaki Yamamoto	Shinshu University, Japan
Hiroshi Shigeno	Keio University, Japan
Houssem Chihoub	Grenoble Institute of Technology, France
Ilias Savvas	TEI of Larissa, Greece
Inna Skarga-Bandurova	East Ukrainian National University, Ukraine
Isaac Woungang	Ryerson University, Canada
Ja'far Alqatawna	Higher Colleges of Technology, UAE
Jamal Alsakran	Higher Colleges of Technology, UAE
Jamshaid Ashraf	Data Processing Services, Kuwait
Jaydeep Howlader	National Institute of Technology, Durgapur, India
Jeffrey Ray	Edge Hill University, UK
Ji, Zhang	The University of Southern Queensland, Australia
Jiahong Wang	Iwate Prefectural University, Japan
Kazuyoshi Kojima	Saitama University, Japan
Ken Newman	Higher Colleges of Technology, UAE
Kenzi Watanabe	Hiroshima University, Japan
Kiyoshi Ueda	Nihon University, Japan
Klodiana Goga	ISMB, Italy
Leila Sharifi	Urmia University, Iran
Leyou Zhang	Xidian University, China
Lidia Fotia	Università Mediterranea di Reggio Calabria (DIIES), Italy
Ling Chen	Yangtze University, China
Long Cheng	Eindhoven University of Technology, Netherland
Lucian, Prodan	Polytechnic University Timisoara, Romania
Luiz Fernando Bittencourt	UNICAMP - Universidade Estadual de Campinas, Brazil
Makoto Fujimura	Nagasaki University, Japan

Makoto Nakashima	Oita University, Japan
Mansaf Alam	Jamia Millia Islamia, New Delhi, India
Marcello Trovati	Edge Hill University, UK
Mariacristina Gal	University of Salerno, Italy
Marina Ribaudo	University of Genoa, Italy
Markos Kyritsis	Higher Colleges of Technology, UAE
Marwan Hassani	TU Eindhoven, Netherlands
Massimo Torquati	University of Pisa, Italy
Matthias Steinbauer	Johannes Kepler University Linz, Austria
Matthieu Dorier	Argonne National Laboratory, USA
Mauro Marcelo Mattos	FURB Universidade Regional de Blumenau, Brazil
Mazin Abuharaz	Higher Colleges of Technology, UAE
Minghu Wu	Hubei University of Technology, China
Mingwu Zhang	Hubei University of Technology, China
Minoru Uehara	Toyo University, Japan
Mirang Park	Kanagawa Institute of Technology, Japan
Mohsen Farid	University of Derby, UK
Monther Tarawneh	Higher Colleges of Technology, UAE
Morteza Saberi	UNSW Canberra, Australia
Motoi Yamagiwa	University of Yamanashi, Japan
Mouza Alshemaili	Higher Colleges of Technology, UAE
Muawya Aldalaien	Higher Colleges of Technology, UAE
Mukesh Prasad	University of Technology Sydney, Australia
Muhammad Iqbal	Higher Colleges of Technology, UAE
Naeem Janjua	Edith Cowan University, Australia
Naohiro Hayashibara	Kyoto Sangyo University, Japan
Naonobu Okazaki	University of Miyazaki, Japan
Neha Warikoo	Academia Sinica, Taiwan
Nobukazu Iguchi	Kindai University, Japan
Nobuo Funabiki	Okayama University, Japan
Olivier Terzo	ISMB, Italy
Omar Al Amiri	Higher Colleges of Technology, UAE
Omar Hussain	UNSW Canberra, Australia
Osama Alfarraj	King Saud University, Saudi Arabia
Osama Rahmeh	Higher Colleges of Technology, UAE
P. Sakthivel	Anna University, Chennai, India
Panachit Kittipanya-ngam	Electronic Government Agency, Thailand
Paolo Bellavista	University of Bologna, Italy
Pavel Smrž	Brno University of Technology, Czech Republic
Peer Shah	Higher Colleges of Technology, UAE
Pelle Jakovits	University of Tartu, Estonia
Per Ola Kristensson	University of Cambridge, UK
Philip Moore	Lanzhou University, China
Pietro Ruiu	ISMB, Italy

Pornthep Rojanavasu	University of Phayao, Thailand
Pruet Boonma	Chiang Mai University, Thailand
Raffaele Pizzolante	University of Salerno, Italy
Ragib, Hasan	The University of Alabama at Birmingham, USA
Rao Mikkilineni	C3DNA, USA
Richard Conniss	University of Derby, UK
Ruben Mayer	University of Stuttgart, Germany
Sachin Shetty	Old Dominion University, USA
Sajal Mukhopadhyay	National Institute of Technology, Durgapur, India
Salem Alkhalaf	Qassim University, Saudi Arabia
Salvatore Ventiqincue	University of Campania Luigi Vanvitelli, Italy
Samia Kouki	Higher Colleges of Technology, UAE
Saqib Ali	Sultan Qaboos University, Australia
Sayyed Maisikeli	Higher Colleges of Technology, UAE
Sazia Parvin	Deakin University, Australia
Sergio Ricciardi	BarcelonaTech, Spain
Shadi Ibrahim	Inria Rennes, France
Shigetomo Kimura	University of Tsukuba, Japan
Shinji Sugawara	Chiba Institute of Technology, Japan
Sivadon Chaisiri	University of Waikato, New Zealand
Sofian Maabout	Bordeaux University, France
Sotirios Kontogiannis	University of Ioannina, Greece
Stefan Bosse	University of Bremen
Stefania Boffa	Università dell'Insubria, Italy
Stefania Tomasiello	University of Salerno, Italy
Stefano Forti	University of Pisa, Italy
Stefano Secci	LIP6, University Paris 6, France
Suayb Arslan	MEF University, Turkey
Subhrabrata Choudhury	National Institute of Technology, Durgapur, India
Suleiman Al Masri	Higher Colleges of Technology, UAE
Tatiana A. Gavrilova	St. Petersburg University, Russia
Teodor Florin Fortis	West University of Timisoara, Romania
Thamer AlHussain	Saudi Electronic University, Saudi Arabia
Titela Vilceanu	University of Craiova, Romania
Tomoki Yoshihisa	Osaka University, Japan
Tomoya Kawakami	NAIST, Japan
Toshihiro Yamauchi	Okayama University, Japan
Toshiya Takami	Oita University, Japan
Ugo Fiore	Parthenope University, Italy
Venkatesha Prasad	Delft University of Technology, Netherland
Victor Kardeby	RISE Acreo, Sweden
Vlado Stankovski	University of Ljubljana, Slovenia
Walayat Hussain	University of Technology Sydney, Australia
Xiaoou Song	Engineering University of CAPF, China
Xingzhi Sun	IBM Research, Australia

Xu An Wang	Engineering University of CAPF, China
Xuan Guo	Officer's University of CAPF, China
Xue Li	The University of Queensland, Australia
Yang Lei	Engineering University of CAPF, China
Yongqiang Li	Xi'an High Technology Research Institute, China
Yoshihiro Okada	Kyushu University, Japan
Yoshinobu Tamura	Tokyo City University, Japan
Yue Zhao	National Institutes of Health, USA
Yuechuan Wei	Engineering University of CAPF, China
Yunbo Li	IMT Atlantique, France
Zasheen Hameed	Higher Colleges of Technology, UAE
Zhenhua Chen	Xi'an University of Technology, China
Zhiqiang Gao	Engineering University of CAPF, China
Zia Rehman	COMSATS Institute of Information Technology (CIIT), Pakistan

EIDWT-2019 Reviewers

Ali Khan Zahoor
Alsakran Jamal
Amato Flora
Amato Alba
Barolli Admir
Barolli Leonard
Bista Bhed
Caballé Santi
Chellappan Sriram
Chen Hsing-Chung
Cui Baojiang
Di Martino Beniamino
Embarak Ossama
Enokido Tomoya
Ficco Massimo
Fiore Ugo
Fun Li Kin
Gotoh Yusuke
Hussain Farookh
Hussain Omar
Javaid Nadeem
Ikeda Makoto
Ishida Tomoyuki
Kikuchi Hiroaki
Kolici Vladi
Koyama Akio
Kouki Samia
Kulla Elis
Matsuo Keita
Koyama Akio
Kryvinska Natalia
Nishino Hiroaki
Ogiela Lidia
Ogiela Marek
Palmieri Francesco
Paruchuri Vamsi Krishna
Rahayu Wenny
Sato Fumiaki
Spaho Evjola
Takizawa Makoto
Taniar David
Tarawneh Monther
Terzo Olivier
Uehara Minoru
Venticinque Salvatore
Wang Xu An
Woungang Isaac
Xhafa Fatos

EIDWT-2019 Keynote Talks

How to Build Intelligent Collectives for Prediction Market Tasks

Ngoc-Thanh Nguyen

Wroclaw University of Science and Technology, Wroclaw, Poland

Abstract. This talk presents a general framework for building intelligent collectives for prediction market tasks. It will be shown that two aspects play an important role in this process: diversity and independency. Our findings qualify the positive impact of diversity and independence on collective performance. Particularly, collectives with higher diversity and independence levels will lead to better collective accuracy. Subsequently, expanding the collective cardinality that causes an increase in its diversity will also be positively associated with the collective performance. With some restrictions, the hypothesis "The more diverse the collective, the higher the collective performance" is formally proved.

Cooperative Wireless Relay Networks

Jacek Ilow

Dalhousie University, Halifax, Canada

Abstract. This talk presents principles involved in designing Multiple-Input-Multiple-Output (MIMO) wireless relay networks with different levels of coordination between communicating terminals in ad hoc networks. In particular, cooperative transmission strategies are contrasted with the approaches where terminals transmit independently resulting in high levels of interference. A unifying framework of power control and signal alignment is adopted to demonstrate better power and bandwidth efficiency in cooperative communication systems with compute-and-forward strategies, that exploits interference to obtain significantly higher rates between users in a network. Geometric concepts and abstractions are used to establish the energy-efficient relay choices and to design distributed signal coding to combat fading in networks with randomly distributed nodes such as in Wireless Sensor Networks (WSNs). The benefits of distributed network coding reducing the number of transmissions are examined. While cooperation improves energy efficiency in wireless networks, it introduces a protocol overhead. The balancing of the cooperative gain (in terms of energy and bandwidth efficiency) and the cooperation overhead is also presented in this talk.

Contents

A Fuzzy-Based System for Cloud-Fog-Edge Selection in VANETs 1
Kevin Bylykbashi, Yi Liu, Keita Matsuo, Makoto Ikeda, Leonard Barolli, and Makoto Takizawa

Group Speed Parameter Effect for Clustering of Vehicles in VANETs: A Fuzzy-Based Approach 13
Kosuke Ozera, Kevin Bylykbashi, Yi Liu, Makoto Ikeda, Leonard Barolli, and Makoto Takizawa

A Fuzzy-Based System for Selection of Actor Nodes in WSANs Considering Actor Reliability and Load Distribution 25
Donald Elmazi, Miralda Cuka, Makoto Ikeda, Leonard Barolli, and Makoto Takizawa

IoT Device Selection in Opportunistic Networks: A Fuzzy Approach Considering IoT Device Failure Rate 39
Miralda Cuka, Donald Elmazi, Keita Matsuo, Makoto Ikeda, Leonard Barolli, and Makoto Takizawa

A Comparison Study for Chi-Square and Uniform Client Distributions by WMN-PSOSA Simulation System for WMNs 53
Shinji Sakamoto, Leonard Barolli, and Shusuke Okamoto

Performance Analysis of WMNs by WMN-PSODGA Simulation System Considering Exponential and Chi-Square Client Distributions 66
Admir Barolli, Shinji Sakamoto, Leonard Barolli, and Makoto Takizawa

Evaluation of a Protocol to Prevent Illegal Information Flow Based on Maximal Roles in the RBAC Model 80
Shohei Hayashi, Shigenari Nakamura, Dilawaer Duolikun, Tomoya Enokido, and Makoto Takizawa

Implementation of Fog Nodes in the Tree-Based Fog Computing (TBFC) Model of the IoT 92
Ryusei Chida, Yinzhe Guo, Ryuji Oma, Shigenari Nakamura, Dilawaer Duolikun, Tomoya Enokido, and Makoto Takizawa

A Framework for Automatically Generating IoT Security Quizzes in a Virtual 3D Environment Based on Linked Data 103
Wei Shi, Chenguang Ma, Srishti Kulshrestha, Ranjan Bose, and Yoshihiro Okada

Authentication Protocols Using Multi-level Cognitive CAPTCHA 114
Marek R. Ogiela and Lidia Ogiela

Linguistic-Based Security in Fog and Cloud Computing 120
Urszula Ogiela, Makoto Takizawa, and Lidia Ogiela

Obfuscation Algorithms Based on Congruence Equation and Knapsack Problem 128
Da Xiao, Shouying Bai, Qian Wu, and Baojiang Cui

Terminal Access Data Anomaly Detection Based on GBDT for Power User Electric Energy Data Acquisition System 137
Qian Ma, Bin Xu, Bang Sun, Feng Zhai, and Baojiang Cui

E-Learning Material Development Framework Supporting 360VR Images/Videos Based on Linked Data for IoT Security Education 148
Yoshihiro Okada, Akira Haga, Shi Wei, Chenguang Ma, Srishti Kulshrestha, and Ranjan Bose

Domain Formalization for Metaphorical Reasoning 161
Flora Amato, Giovanni Cozzolino, and Francesco Moscato

A Hybrid Approach for Document Analysis in Digital Forensic Domain 170
Flora Amato, Giovanni Cozzolino, Marco Giacalone, Francesco Moscato, Francesco Romeo, and Fatos Xhafa

Evaluating Indoor Location Triangulation Using Wi-Fi Signals 180
Yasir Javed, Zahoor Khan, and Sayed Asif

Big Data Role in Improving Intelligent Transportation Systems Safety: A Survey 187
Mohammed Arif Amin, Samah Hadouej, and Tasneem S. J. Darwish

Predicting Cancer Survivability: A Comparative Study 200
Ola Abu Elberak, Loai Alnemer, Majdi Sawalha, and Jamal Alsakran

Enhanced Classification of Sentiment Analysis of Arabic Reviews 210
Loai Alnemer, Bayan Alammouri, Jamal Alsakran, and Omar El Ariss

Load and Price Forecasting Based on Enhanced Logistic Regression in Smart Grid 221
Aroosa Tahir, Zahoor Ali Khan, Nadeem Javaid, Zeeshan Hussain, Aimen Rasool, and Syeda Aimal

Effect of Peer Mobility for a Fuzzy-Based Peer Coordination Quality System in Mobile P2P Networks 234
Vladi Kolici, Yi Liu, Keita Matsuo, and Leonard Barolli

Load and Price Forecasting in Smart Grids Using Enhanced Support Vector Machine 247
Ammara Nayab, Tehreem Ashfaq, Syeda Aimal, Aimen Rasool, Nadeem Javaid, and Zahoor Ali Khan

Data Analytics for Load and Price Forecasting via Enhanced Support Vector Regression 259
Tanzeela Sultana, Zahoor Ali Khan, Nadeem Javaid, Syeda Aimal, Aisha Fatima, and Shaista Shabbir

A Deep Learning Approach Towards Price Forecasting Using Enhanced Convolutional Neural Network in Smart Grid 271
Fahad Ahmed, Maheen Zahid, Nadeem Javaid, Abdul Basit Majeed Khan, Zahoor Ali Khan, and Zain Murtaza

Semantic Multi Agent Architecture for Chronic Disease Monitoring and Management 284
Lina Nachabe, Bachar El Hassan, and Jean Taleb

Big Data Analytics in E-procurement of a Chain Hotel 295
Elezabeth Mathew

Data Modeling and Visualization of Tax Strategies Employed by Overseas American Individuals and Firms 309
Alfred Howard Miller

A New Transformation of 3D Models Using Chaotic Encryption Based on Arnold Cat Map 322
Benson Raj, L. Jani Anbarasi, Modigari Narendra, and V. J. Subashini

Feasibility Approach Based on SecMonet Framework to Protect Networks from Advanced Persistent Threat Attacks 333
Maher Salem and Moayyad Mohammed

Trust Analysis for Information Concerning Food-Related Risks 344
Alessandra Amato and Giovanni Cozzolino

Outgoing Data Filtration for Detecting Spyware on Personal Computers 355
Aishwarya Afzulpurkar, Mouza Alshemaili, and Khalid Samara

Formulation of Information Hiding Model for One-Time Authentication Methods Using the Merkle Tree 363
Yuji Suga

An Approach to Discover Malicious Online Users in Collaborative Systems 374
Ossama Embarak, Maryam Khaleifah, and Alya Ali

Understanding Students Personality to Detect Their Learning Differences 383
Ossama Embarak, Zahoor Khan, and Binod Gurung

A Novel Simulation Based Classifier Using Random Tree and Reinforcement Learning 391
Israr Ahmed, Munir Naveed, and Mohammed Adnan

Perceiving Intellectual Style to Solve Privacy Problem in Collaborative Systems 401
Ossama Embarak, Kholoud Saeed, and Manal Ali

An Enhanced Knowledge Integration of Association Rules in the Privacy Preserved Distributed Environment to Identify the Exact Interesting Pattern 411
Sujni Paul

Application of Fog and Cloud Computing for Patient's Data in the Internet of Things 425
Soulat Waheed and Peer A. Shah

Adoption of Emerging Technologies in Supply Chain Operations for Cost Reduction and Enhancement of Shareholder Wealth: A Case Study of UAE Organization 437
Benjamin S. Bvepfepfe, Amjad khan Suri, and Ali El Asad

Hybrid Approach for Heart Disease Prediction Using Data Mining Techniques 447
Monther Tarawneh and Ossama Embarak

A Hybrid Optimization GNA Algorithm for the Quadratic Assignment Problem Solving 455
Kefaya Qaddoum and Azmi Al Azzam

An Enhanced Model for Abusive Behavior Detection in Social Network 465
Kefaya Qaddoum, Israr Ahmad, Yasir Javed, and Ali Rodan

Proposal of a Regional Culture Inheritance System by AR Technology 472
Hengyi Li and Tomoyuki Ishida

Clinical Trial on Computer-Aided Design in Pre-operative Alveolar Bone Grafting in Cleft Lip - Cleft Palate Patient 482
Krit Khwanngern, Vivatchai Kaveeta, Suriya Sitthikham, Watcharaporn Sitthikamtiub, Sineenuch Changkai, and Tanyakorn Namwong

Large-Scale Simulation of Site-Specific Propagation Model: Defining Reference Scenarios and Performance Evaluation 492
Zeeshan Hameed Mir

Security Approach for In-Vehicle Networking Using Blockchain Technology 504
Maher Salem, Moayyad Mohammed, and Ali Rodan

Towards Optimizing Energy Efficiency and Alleviating Void Holes in UWSN 516
Abdul Mateen, Nadeem Javaid, Muhammad Bilal, Muhammad Arslan Farooq, Zahoor Ali Khan, and Fareena Riaz

Cluster-Based Routing Protocols with Adaptive Transmission Range Adjustment in UWSNs 528
Muhammad Awais, Zahoor Ali Khan, Nadeem Javaid, Abdul Mateen, Aymen Rasul, and Farooq Hassan

A Unicast Rate-Based Protocol for Video Streaming Applications over the Internet 540
G.-A. Lusilao Zodi, T. Ankome, J. Mateus, L. Iiyambo, and J. Silaa

TCP with Network Coding Performance Under Packet Reordering 552
Nguyen Viet Ha and Masato Tsuru

A Common Ontology Based Approach for Clinical Practice Guidelines Using OWL-Ontologies 564
Khalid Samara, Munir Naveed, Yasir Javed, and Mouza Alshemaili

Author Index 577