Advances in Intelligent Systems and Computing

Volume 320

Series editor

Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland
e-mail: kacprzyk@ibspan.waw.pl

About this Series

The series "Advances in Intelligent Systems and Computing" contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

The publications within "Advances in Intelligent Systems and Computing" are primarily textbooks and proceedings of important conferences, symposia and congresses. They cover significant recent developments in the field, both of a foundational and applicable character. An important characteristic feature of the series is the short publication time and world-wide distribution. This permits a rapid and broad dissemination of research results.

Advisory Board

Chairman

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India
e-mail: nikhil@isical.ac.in

Members

Rafael Bello, Universidad Central "Marta Abreu" de Las Villas, Santa Clara, Cuba
e-mail: rbellop@uclv.edu.cu

Emilio S. Corchado, University of Salamanca, Salamanca, Spain
e-mail: escorchado@usal.es

Hani Hagras, University of Essex, Colchester, UK
e-mail: hani@essex.ac.uk

László T. Kóczy, Széchenyi István University, Győr, Hungary
e-mail: koczy@sze.hu

Vladik Kreinovich, University of Texas at El Paso, El Paso, USA
e-mail: vladik@utep.edu

Chin-Teng Lin, National Chiao Tung University, Hsinchu, Taiwan
e-mail: ctlin@mail.nctu.edu.tw

Jie Lu, University of Technology, Sydney, Australia
e-mail: Jie.Lu@uts.edu.au

Patricia Melin, Tijuana Institute of Technology, Tijuana, Mexico
e-mail: epmelin@hafsamx.org

Nadia Nedjah, State University of Rio de Janeiro, Rio de Janeiro, Brazil
e-mail: nadia@eng.uerj.br

Ngoc Thanh Nguyen, Wroclaw University of Technology, Wroclaw, Poland
e-mail: Ngoc-Thanh.Nguyen@pwr.edu.pl

Jun Wang, The Chinese University of Hong Kong, Shatin, Hong Kong
e-mail: jwang@mae.cuhk.edu.hk

More information about this series at http://www.springer.com/series/11156

El-Sayed M. El-Alfy · Sabu M. Thampi
Hideyuki Takagi · Selwyn Piramuthu
Thomas Hanne
Editors

Advances in Intelligent Informatics

Springer

Editors
El-Sayed M. El-Alfy
King Fahd University of Petroleum and Minerals
Dhahran
Saudi Arabia

Sabu M. Thampi
Indian Institute of Information Technology and Management - Kerala (IIITM-K)
Kerala
India

Hideyuki Takagi
Faculty of Design
Kyushu University
Fukuoka
Japan

Selwyn Piramuthu
Department of Information Systems and Operations Management
Warrington College of Business Administration
University of Florida
Florida
USA

Thomas Hanne
Institute for Information Systems
University of Applied Sciences
Olten
Switzerland

ISSN 2194-5357 ISSN 2194-5365 (electronic)
ISBN 978-3-319-11217-6 ISBN 978-3-319-11218-3 (eBook)
DOI 10.1007/978-3-319-11218-3

Library of Congress Control Number: 2014948178

Springer Cham Heidelberg New York Dordrecht London

© Springer International Publishing Switzerland 2015
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. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.
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.
While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

The third International Symposium on Intelligent Informatics (ISI-2014) provided a forum for sharing original research results and practical development experiences among experts in the emerging areas of Intelligent Informatics. This edition was co-located with third International Conference on Advances in Computing, Communications and Informatics (ICACCI-2014), September 24–27, 2014. The Symposium was hosted by Galgotias College of Engineering & Technology, Greater Noida, Delhi, India.

ISI-2014 had two tracks: 'Advances in Intelligent Informatics' and a special track on 'Intelligent Distributed Computing'. In response to the call for papers, 134 papers were submitted for the Intelligent Informatics Track and 63 submissions for the Intelligent Distributed Computing track. All the papers were evaluated on the basis of their significance, novelty, and technical quality. Each paper was rigorously reviewed by the members of the program committee. This book contains a selection of refereed and revised papers of Intelligent Informatics Track originally presented at the symposium. In this track, 58 were accepted. The peer-reviewed papers selected for this Track cover several intelligent informatics and related topics including signal processing, pattern recognition, image processing, data mining and intelligent information systems.

Many people helped to make ISI-2014 a successful event. Credit for the quality of the conference proceedings goes first and foremost to the authors. They contributed a great deal of effort and creativity to produce this work, and we are very thankful that they chose ISI-2014 as the place to present it. Thanks to all members of the Technical Program Committee, and the external reviewers, for their hard work in evaluating and discussing papers. We wish to thank all the members of the Steering Committee and Organising Committee, whose work and commitment were invaluable. Our most sincere thanks go to all keynote speakers who shared with us their expertise and knowledge. The EDAS conference system proved very helpful during the submission, review, and editing phases.

We thank the Galgotias College of Engineering & Technology, Greater Noida, Delhi for hosting the conference. Sincere thanks to Suneel Galgotia, Chairman, GEI,

Dhruv Galgotia, CEO, GEI, R. Sundaresan, Director, GCET and Bhawna Mallick, Local Arrangements Chair for their valuable suggestions and encouragement.

We wish to express our thanks to Thomas Ditzinger, Senior Editor, Engineering/Applied Sciences Springer-Verlag for his help and cooperation.

September 2014

El-Sayed M. El-Alfy
Sabu M. Thampi
Hideyuki Takagi
Selwyn Piramuthu
Thomas Hanne

Organization

ISI'14 Committee

General Chair

Kuan-Ching Li	Providence University, Taiwan

TPC Chairs

El-Sayed M. El-Alfy	King Fahd University of Petroleum and Minerals, Saudi Arabia
Selwyn Piramuthu	University of Florida, USA
Thomas Hanne	University of Applied Sciences, Switzerland

TPC Members

A.B.M. Moniruzzaman	Daffodil International University, Bangladesh
A.F.M. Sajidul Qadir	Samsung R&D Institute-Bangladesh, Bangladesh
Abdelmajid Khelil	Huawei European Research Center, Germany
Aboul Ella Hassanien	University of Cairo, Egypt
Adel Alimi	REGIM, University of Sfax, National School of Engineers, Tunisia
Afshin Shaabany	University of Fasa, Iran
Agostino Bruzzone	University of Genoa, Italy
Aitha Nagaraju	CURAJ, India
Ajay Jangra	KUK University, Kurukshetra, Haryana, India
Ajay Singh	Multimedia University, Malaysia
Akash Singh	IBM, USA
Akhil Gupta	Shri Mata Vaishno Devi University, India
Akihiro Fujihara	Fukui University of Technology, Japan
Alex James	Nazarbayev University, Kazakhstan

Ali Yavari	KTH Royal Institute of Technology, Sweden
Amit Acharyya	IIT HYDERABAD, India
Amit Gautam	SP College of Engineering, India
Amudha J.	Anrita Vishwa Vidyapeetham, India
Anca Daniela Ionita	University Politehnica of Bucharest, Romania
Angelo Trotta	University of Bologna, Italy
Angelos Michalas	Technological Education Institute of Western Macedonia, Greece
Anirban Kundu	Kuang-Chi Institute of Advanced Technology, P.R. China
Aniruddha Bhattacharjya	Amrita School of Engineering Bangalore, India
Anjana Gosain	Indraprastha University, India
Antonio LaTorre	Universidad Politécnica de Madrid, Spain
Arpan Kar	Indian Institute of Management, Rohtak, India
Ash Mohammad Abbas	Aligarh Muslim University, India
Ashish Saini	Dayalbagh Educational Institute, India
Ashraf S.	IITMK, India
Athanasios Pantelous	University of Liverpool, United Kingdom
Atsushi Takeda	Tohoku Gakuin University, Japan
Atul Negi	University of Hyderabad, India
Azian Azamimi Abdullah	Universiti Malaysia Perlis, Malaysia
B.H. Shekar	Mangalore University, India
Belal Abuhaija	University of Tabuk, Saudi Arabia
Bhushan Trivedi	GLS Institute Of Computer Technology, India
Bilal Gonen	University of West Florida, USA
Bilal Khan	University of Sussex, United Kingdom
Chia-Hung Lai	National Cheng Kung University, Taiwan
Chia-Pang Chen	National Taiwan University, Taiwan
Chien-Fu Cheng	Tamkang University, Taiwan
Chiranjib Sur	ABV-Indian Institute of Information Technology & Management, Gwalior, India
Chunming Liu	T-Mobile USA, USA
Ciprian Dobre	University Politehnica of Bucharest, Romania
Ciza Thomas	Indian Institute of Science, India
Constandinos Mavromoustakis	University of Nicosia, Cyprus
Dalila Chiadmi	Mohammadia School of Engineering, Morocco
Daniela Castelluccia	University of Bari, Italy
Deepak Mishra	IIST, India
Deepti Mehrotra	AMITY School of Engineering and Technology, India
Demetrios Sampson	University of Piraeus, Greece
Dennis Kergl	Universität der Bundeswehr München, Germany
Dhananjay Singh	Hankuk University of Foreign Studies, Korea
Dimitrios Stratogiannis	National Technical University of Athens, Greece

Durairaj Devaraj	Kalasalingam University, India
Emilio Jiménez Macías	University of La Rioja, Spain
Evgeny Khorov	IITP RAS, Russia
Farrah Wong	Universiti Malaysia Sabah, Malaysia
Fikret Sivrikaya	Technische Universität Berlin, Germany
G. Thakur	MANIT Bhopal, India
Gancho Vachkov	The University of the South Pacific (USP), Fiji
Gorthi Manyam	IIST, India
Gregorio Romero	Universidad Politecnica de Madrid, Spain
Grienggrai Rajchakit	Maejo University, Thailand
Gwo-Jiun Horng	Fortune Institute of Technology, Taiwan
Habib Kammoun	University of Sfax, Tunisia
Habib Louafi	École de Technologies Supérieure (ETS), Canada
Haijun Zhang	Beijing University of Chemical Technology, P.R. China
Hajar Mousannif	Cadi Ayyad University, Morocco
Hammad Mushtaq	University of Management & TEchnology, Pakistan
Hanen Idoudi	National School of Computer Science - University of Manouba, Tunisia
Harikumar Sandhya	Amrita Vishwa Vidyapeetham, India
Hemanta Kalita	North Eastern Hill University, India
Hideaki Iiduka	Kyushu Institute of Technology, Japan
Hossam Zawbaa	Beni-Suef University, Egypt
Hossein Malekmohamadi	University of Lincoln, United Kingdom
Huifang Chen	Zhejiang University, P.R. China
Igor Salkov	Donetsk National University, Ukraine
J. Mailen Kootsey	Simulation Resources, Inc., USA
Jaafar Gaber	UTBM, France
Jagdish Pande	Qualcomm Inc., USA
Janusz Kacprzyk	Polish Academy of Sciences, Poland
Javier Bajo	University of Salamanca, Spain
Jaynendra Kumar Rai	Amity School of Engineering and Technology, India
Jia-Chin Lin	National Central University, Taiwan
Jose Delgado	Technical University of Lisbon, Portugal
Jose Luis Vazquez-Poletti	Universidad Complutense de Madrid, Spain
Josip Lorincz	University of Split, Croatia
Jun He	University of New Brunswick, Canada
Junyoung Heo	Hansung University, Korea
K. Majumder	West Bengal University of Technology, India
Kambiz Badie	Iran Telecom Research Center, Iran
Kandasamy SelvaRadjou	Pondicherry Engineering College, India
Kanubhai Patel	Charotar University of Science and Technology (CHARUSAT), India

Kaushal Shukla	Indian Institute of Technology, Banaras Hindu University, India
Kenichi Kourai	Kyushu Institute of Technology, Japan
Kenneth Nwizege	University of SWANSEA, United Kingdom
Kuei-Ping Shih	Tamkang University, Taiwan
Lorenzo Mossucca	Istituto Superiore Mario Boella, Italy
Lucio Agostinho	University of Campinas, Brazil
Luis Teixeira	Universidade Catolica Portuguesa, Portugal
M. Manikandan	Anna University, India
M. Rajasree	IIITMK, India
Mahendra Dixit	SDMCET, India
Malika Bourenane	University of Senia, Algeria
Manjunath Aradhya	Sri Jayachamarajendra College of Engineering, India
Mantosh Biswas	National Institute of Technology-Kurukshetra, India
Manu Sood	Himachal Pradesh University, India
Marcelo Carvalho	University of Brasilia, Brazil
Marco Rospocher	Fondazione Bruno Kessler, Italy
Marenglen Biba	University of New York, Tirana, USA
Martin Randles	Liverpool John Moores University, United Kingdom
Martin Zsifkovits	University of Vienna, Austria
Massimo Cafaro	University of Salento, Italy
Melih Karaman	Bogazici University, Turkey
Mikulas Alexik	University of Zilina, Slovakia
Mohamad Noh Ahmad	Universiti Teknologi Malaysia, Malaysia
Mohamed Ba khouya	University of Technology of Belfort Montbeliard, France
Mohamed Dahmane	University of Montreal, Canada
Mohamed Moussaoui	Abdelmalek Esaadi UniversitY, Morocco
Mohammad Monirujjaman Khan	University of Liberal Arts Bangladesh, Bangladesh
Mohammed Mujahid Ulla Faiz	King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia
Mohand Lagha	Saad Dahlab University of Blida - Blida - Algeria, Algeria
Mohd Ramzi Mohd Hussain	International Islamic University Malaysia, Malaysia
Monica Chis	Frequentis AG, Romania
Monika Gupta	GGSIPU, India
Mukesh Taneja	Cisco Systems, India
Mustafa Khandwawala	University of North Carolina at Chapel Hill, USA
Muthukkaruppan Annamalai	Universiti Teknologi MARA, Malaysia

Naveen Aggarwal	Panjab University, India
Nestor Mora Nuñez	Cadiz University, Spain
Nico Saputro	Southern Illinois University Carbondale, USA
Nisheeth Joshi	Banasthali University, India
Noor Mahammad Sk	Indian Institute of Information Technology Design and Manufacturing (IIITDM) , India
Nora Cuppens-Boulahia	IT TELECOM Bretagne, France
Olaf Maennel	Loughborough University, United Kingdom
Omar ElTayeby	Clark Atlanta University, USA
Oskars Ozolins	Riga Technical University, Latvia
Otavio Teixeira	Centro Universitário do Estado do Pará (CESUPA), Brazil
Pedro Gonçalves	Universidade de Aveiro, Portugal
Peiyan Yuan	Henan Normal University, P.R. China
Petia Koprinkova-Hristova	Bulgarian Academy of Sciences, Bulgaria
Philip Moore	Lanzhou University, United Kingdom
Praveen Srivastava	Indian Institute of Management (IIM), India
Pravin Patil	Graphic Era University Dehradun, India
Qin Lu	University of Technology, Sydney, Australia
Rabeb Mizouni	Khalifa University, UAE
Rachid Anane	Coventry University, United Kingdom
Rafael Pasquini	Federal University of Uberlândia - UFU, Brazil
Rajeev Kumaraswamy	Network Systems & Technologies Private Ltd, India
Rajeev Shrivastava	MPSIDC, India
Rajib Kar	National Institute of Technology, Durgapur, India
Rakesh Nagaraj	Amrita School of Engineering, India
Rama Garimella	IIIT Hyderabad, India
Ranjan Das	Indian Institute of Technology Ropar, India
Rashid Ali	College of Computers and Information Technology, Taif University, Saudi Arabia
Raveendranathan Kl C.	University of Kerala, India
Ravibabu Mulaveesala	Indian Institute of Technology Ropar, India
Rivindu Perera	Auckland University of Technology, New Zealand
Rubita Sudirman	Universiti Teknologi Malaysia, Malaysia
Ryosuke Ando	Toyota Transportation Research Institute (TTRI), Japan
Sakthi Balan	Infosys Ltd., India
Salvatore Venticinque	Second University of Naples, Italy
Sameer Saheerudeen Mohammed	National Institute of Technology Calicut, India
Sami Habib	Kuwait University, Kuwait
Sasanko Gantayat	GMR Institute of Technology, India
Satish Chandra	Jaypee Institute of Information Technology, India

Satya Ghrera	Jaypee University of Information Technology, India
Scott Turner	University of Northampton, United Kingdom
Selvamani K.	Anna University, India
Shalini Batra	Thapar University, India
Shanmugapriya D.	Avinashilingam Institute , India
Sheeba Rani	IIST Trivandrum, India
Sheng-Shih Wang	Minghsin University of Science and Technology, Taiwan
Shubhajit Roy Chowdhury	IIIT Hyderabad, India
Shuping Liu	University of Southern California, USA
Shyan Ming Yuan	National Chiao Tung University, Taiwan
Siby Abraham	University of Mumbai, India
Simon Fong	University of Macau, Macao
Sotiris Karachontzitis	University of Patras, Greece
Sotiris Kotsiantis	University of Patras, Greece
Sowmya Kamath S.	National Institute of Technology, Surathkal, India
Sriparna Saha	IIT Patna, India
Su Fong Chien	MIMOS Berhad, Malaysia
Sujit Mandal	National Institute of Technology, Durgapur, India
Suma V.	Dayananda Sagar College of Engineering, VTU, India
Suryakanth Gangashetty	IIIT Hyderabad, India
Tae (Tom) Oh	Rochester Institute of Technology, USA
Teruaki Ito	University of Tokushima, Japan
Tilokchan Irengbam	Manipur University, India
Traian Rebedea	University Politehnica of Bucharest, Romania
Tutut Herawan	Universiti Malaysia Pahang, Malaysia
Usha Banerjee	College of Engineering Roorkee, India
V. Vityanathan	SASTRA Universisty, India
Vatsavayi Valli Kumari	Andhra University, India
Veronica Moertini	Parahyangan Catholic University, Bandung, Indonesia
Vikrant Bhateja	Shri Ramswaroop Memorial Group of Professional Colleges, Lucknow (UP), India
Visvasuresh Victor Govindaswamy	Concordia University, USA
Vivek Sehgal	Jaypee University of Information Technology, India
Vivek Singh	Banaras Hindu University, India
Wan Hussain Wan Ishak	Universiti Utara Malaysia, Malaysia
Wei Wei	Xi'an University of of Technology, P.R. China
Xiaoya Hu	Huazhong University of Science and Technology, P.R. China
Xiao-Yang Liu	Columbia University, P.R. China
Yingyuan Xiao	Tianjin University of Technology, P.R. China

Yong Liao	NARUS INC., USA
Yoshitaka Kameya	Meijo University, Japan
Yuming Zhou	Nanjing University, P.R. China
Yu-N Cheah	Universiti Sains Malaysia, Malaysia
Zhenzhen Ye	IBM, USA
Zhijie Shen	Hortonworks, Inc., USA
Zhuo Lu	Intelligent Automation, Inc, USA

Additional Reviewers

Abdelhamid Helali	ISIMM, Tunisia
Adesh Kumar	UPES, India
Adriano Prates	Universidade Federal Fluminense, Brazil
Amitesh Rajput	Sagar Institute of Science & Technology, Bhopal, India
Antonio Cimmino	Zurich University of Applied Sciences, Switzerland
Aroua Hedhili	SOIE, National School of Computer Studies (ENSI), Tunisia
Azhana Ahmad	Universiti Tenaga Nasional, Malaysia
Behnam Salimi	UTM, Malaysia
Carolina Zato	University of Salamanca, Spain
Damandeep Kaur	Thapar University, India
Devi Arockia Vanitha	The Standard Fireworks Rajaratnam College for Women, Sivakasi, India
Divya Upadhyay	Amity School of Engineering & Technology, Amity University Noida, India
Gopal Chaudhary	NSIT, India
Hanish Aggarwal	Indian Institute of Technology Roorkee, India
Indrajit De	MCKV Institute of Engineering, India
Iti Mathur	Banasthali University, India
Kamaldeep Kaur	Guru Gobind Singh Indraprastha University, India
Kamyar Mehranzamir	UTM, Malaysia
KOTaiah Bonthu	Babasaheb Bhimrao Ambedkar University, Lucknow, India
Laila Benhlima	Mohammed V-Agdal University, Mohammadia School of Engineering, Morocco
M. Karuppasamypandiyan	Kalasalingam University, India
Mahalingam Pr.	Muthoot Institute of Technology and Science, India
Manisha Bhende	University of Pune, India
Mariam Kassim	Anna University, India

Mohammad Abuhweidi	University of Malaya, Malaysia
Mohammad Hasanzadeh	Amirkabir University of Technology, Iran
Muhammad Imran Khan	University of Toulouse, France
Muhammad Murtaza	University of Engineering and Technology Lahore, Pakistan
Muhammad Rafi	FAST-NU, Pakistan
Mukundhan Srinivasan	Indian Institute of Science, India
Naresh Kumar	GGSIPU, India
Nasimi Eldarov	Saarland University, Germany
Nattee Pinthong	Mahanakorn University of Technology, Thailand
Nouman Rao	Higher Education Commission of Pakistan, Pakistan
Omar Al Saif	Mosul University, Iraq
Orlewilson Maia	Federal University of Minas Gerais, Brazil
Pankaj Kulkarni	Rajasthan Technical University, India
Paulus Sheetekela	MIPT SU, Russia
Pooja Tripathi	IPEC, India
Prakasha Shivanna	RNS Institute of Technology, India
Pratiyush Guleria	Himachal Pradesh University Shimla, India
Preetvanti Singh	Dayal Bagh Educational Institute, India
Prema Nedungadi	Amrita University, India
Rathnakar Achary	Alliance Business Academy, India
Rohit Thanki	C U Shah Unversity, India
Roozbeh Zarei	Victoria University, Australia
Saida Maaroufi	Ecole Polytechnique de Montréal, Canada
Saraswathy Shamini Gunasekaran	Universiti Tenaga Nasional, Malaysia
Sarvesh Sharma	BITS-Pilani, India
Senthil Sivakumar	St. Joseph University, Tanzania
Seyedmostafa Safavi	Universiti Kebangsaan Malaysia, Malaysia
Shanmuga Sundaram Thangavelu	Amrita Vishwa Vidyapeetham, India
Shruti Kohli	Birla institute of Technology, India
Sudhir Rupanagudi	WorldServe Education, India
Thenmozhi Periasamy	Avinashilingam University, India
Tripty Singh	Amrita Vishwa Vidyapeetham, India
Umer Abbasi	Universiti Teknologi PETRONAS, Malaysia
Vaidehi Nedu	Dayananda Sagar College of Engineering, India
Vijender Solanki	Anna University, Chennai, India
Vinita Mathur	JECRC, Jaipur, India
Vipul Dabhi	Information Technology Department, Dharmsinh Desai University, India
Vishal Gupta	BITS, India

Vrushali Kulkarni	College of Engineering, Pune, India
Yatendra Sahu	Samrat Ashok Technological Institute, India
Yogesh Meena	Hindustan Institute of Technology and Management, India
Yogita Thakran	Indian Institute of Technology Roorkee, India
Zhiyi Shao	Shaanxi Normal University, P.R. China

Steering Committee

Antonio Puliafito	MDSLab - University of Messina, Italy
Axel Sikora	University of Applied Sciences Offenburg, Germany
Bharat Bhargava	Purdue University, USA
Chandrasekaran K.	NITK, India
Deepak Garg, Chair	IEEE Computer Society Chapter, IEEE India Council
Dilip Krishnaswamy	IBM Research - India
Douglas Comer	Purdue University, USA
El-Sayed M. El-Alfy	King Fahd University of Petroleum and Minerals, Saudi Arabia
Gregorio Martinez Perez	University of Murcia, Spain
Hideyuki Takagi	Kyushu University, Japan
Jaime Lloret Mauri	Polytechnic University of Valencia, Spain
Jianwei Huang	The Chinese University of Hong Kong, Hong Kong
John F. Buford	Avaya Labs Research, USA
Manish Parashar	Rutgers, The State University of New Jersey, USA
Mario Koeppen	Kyushu Institute of Technology, Japan
Nallanathan Arumugam	King's College London, United Kingdom
Nikhil R. Pal	Indian Statistical Institute, Kolkata, India
Pascal Lorenz	University of Haute Alsace, France
Raghuram Krishnapuram	IBM Research - India
Raj Kumar Buyya	University of Melbourne, Australia
Sabu M. Thampi	IIITM-K, India
Selwyn Piramuthu	University of Florida, USA
Suash Deb, President	Intl. Neural Network Society (INNS), India Regional Chapter

ICACCI Organising Committee

Chief Patron

Suneel Galgotia, Chairman	GEI, Greater Noida

Patrons

Dhruv Galgotia	CEO, GEI, Greater Noida
R. Sundaresan, Director	GCET, Greater Noida

General Chairs

Sabu M. Thampi	IIITM-K, India
Demetrios G. Sampson	University of Piraeus, Greece
Ajith Abraham	MIR Labs, USA & Chair, IEEE SMCS TC on Soft Computing

Program Chairs

Peter Mueller	IBM Zurich Research Laboratory, Switzerland
Juan Manuel Corchado Rodriguez	University of Salamanca, Spain
Javier Aguiar	University of Valladolid, Spain

Industry Track Chair

Dilip Krishnaswamy	IBM Research Labs, Bangalore, India

Workshop and Symposium Chairs

Axel Sikora	University of Applied Sciences Offenburg, Germany
Farag Azzedin	King Fahd University of Petroleum and Minerals, Saudi Arabia
Sudip Misra	Indian Institute of Technology, Kharagpur, India

Special Track Chairs

Amit Kumar	BioAxis DNA Research Centre, India
Debasis Giri	Haldia Institute of Technology, India

Demo/Posters Track Chair

Robin Doss	School of Information Technology, Deakin University, Australia

Keynote/Industry Speakers Chairs

Al-Sakib Khan Pathan	IIUM, Malaysia
Ashutosh Saxena	Infosys Labs, India
Shyam Diwakar	Amrita Vishwa Vidyapeetham Kollam, India

Tutorial Chairs

Sougata Mukherjea	IBM Research-India
Praveen Gauravaram	Tata Consultancy Services Ltd., Hyderabad, India

Doctoral Symposium Chairs

Soura Dasgupta	The University of Iowa, USA
Abdul Quaiyum Ansari	Dept. of Electrical Engg., Jamia Millia Islamia, India
Praveen Ranjan Srivastava	Indian Institute of Management (IIM), Rohtak, India

Organizing Chair

Bhawna Mallick	Galgotias College of Engineering & Technology (GCET), India

Organizing Secretaries

Sandeep Saxena	Dept. of CSE, GCET
Rudra Pratap Ojha	Dept. of IT, GCET

Publicity Chairs

Lucknesh Kumar	Dept. of CSE, GCET
Dharm Raj	Dept. of IT, GCET

Contents

Pattern Recognition, Signal and Image Processing

Artificial Immune System Based Image Enhancement Technique 1
Susmita Ganguli, Prasant Kumar Mahapatra, Amod Kumar

Grayscale to Color Map Transformation for Efficient Image Analysis on Low Processing Devices 9
Shitala Prasad, Piyush Kumar, Kumari Priyanka Sinha

Automatic Classification of Brain MRI Images Using SVM and Neural Network Classifiers 19
N.V.S. Natteshan, J. Angel Arul Jothi

An Investigation of fSVD and Ridgelet Transform for Illumination and Expression Invariant Face Recognition 31
Belavadi Bhaskar, K. Mahantesh, G.P. Geetha

Coslets: A Novel Approach to Explore Object Taxonomy in Compressed DCT Domain for Large Image Datasets 39
K. Mahantesh, V.N. Manjunath Aradhya, S.K. Niranjan

AI Based Automated Identification and Estimation of Noise in Digital Images 49
K.G. Karibasappa, K. Karibasappa

SV-M/D: Support Vector Machine-Singular Value Decomposition Based Face Recognition 61
Mukundhan Srinivasan

A New Single Image Dehazing Approach Using Modified Dark Channel Prior 77
Harmandeep Kaur Ranota, Prabhpreet Kaur

A Fuzzy Regression Analysis Based No Reference Image Quality Metric 87
Indrajit De, Jaya Sil

Application of Fusion Technique in Satellite Images for Change Detection 97
Namrata Agrawal, Dharmendra Singh, Sandeep Kumar

A Survey on Spiking Neural Networks in Image Processing 107
Julia Tressa Jose, J. Amudha, G. Sanjay

Moving Human Detection in Video Using Dynamic Visual Attention Model 117
G. Sanjay, J. Amudha, Julia Tressa Jose

Comparative Analysis of Radial Basis Functions with SAR Images in Artificial Neural Network 125
Abhisek Paul, Paritosh Bhattacharya, Santi Prasad Maity

Blending Concept Maps with Online Labs for STEM Learning 133
Raghu Raman, Mithun Haridas, Prema Nedungadi

Cognitive Load Management in Multimedia Enhanced Interactive Virtual Laboratories 143
Krishnashree Achuthan, Sayoojyam Brahmanandan, Lakshmi S. Bose

The Exploitation of Unused Spectrum for Different Signal's Technologies 157
Ammar Abdul-Hamed Khader, Mainuddin Mainuddin, Mirza Tariq Beg

A Sphere Decoding Algorithm for Underdetermined OFDM/SDMA Uplink System with an Effective Radius Selection 169
K.V. Shahnaz, C.K. Ali

Design of Multiband Metamaterial Microwave BPFs for Microwave Wireless Applications 179
Ahmed Hameed Reja, Syed Naseem Ahmad

Studying the Effects of Metamaterial Components on Microwave Filters 193
Ahmed Hameed Reja, Syed Naseem Ahmad

Incorporating Machine Learning Techniques in MT Evaluation 205
Nisheeth Joshi, Iti Mathur, Hemant Darbari, Ajai Kumar

Multi-output On-Line ATC Estimation in Deregulated Power System Using ANN 215
R. Prathiba, B. Balasingh Moses, Durairaj Devaraj, M. Karuppasamypandiyan

Benchmarking Support Vector Machines Implementation Using Multiple Techniques 227
M.V. Sukanya, Shiju Sathyadevan, U.B. Unmesha Sreeveni

Software Analysis Using Cuckoo Search 239
Praveen Ranjan Srivastava

Memory Based Multiplier Design in Custom and FPGA Implementation 253
M. Mohamed Asan Basiri, S.K. Noor Mahammad

Application of Simulated Annealing for Inverse Analysis of a Single-Glazed Solar Collector 267
Ranjan Das

A Novel Image Encryption and Authentication Scheme Using Chaotic Maps 277
Amitesh Singh Rajput, Mansi Sharma

An Imperceptible Digital Image Watermarking Technique by Compressed Watermark Using PCA 287
Shaik K. Ayesha, V. Masilamani

Spread Spectrum Audio Watermarking Using Vector Space Projections 297
Adamu I. Abubakar, Akram M. Zeki, Haruna Chiroma, Sanah Abdullahi Muaz, Eka Novita Sari, Tutut Herawan

RBDT: The Cascading of Machine Learning Classifiers for Anomaly Detection with Case Study of Two Datasets 309
Goverdhan Reddy Jidiga, Porika Sammulal

Data Mining, Clustering and Intelligent Information Systems

Analysis and Evaluation of Discriminant Analysis Techniques for Multiclass Classification of Human Vocal Emotions 325
Swarna Kuchibhotla, Hima Deepthi Vankayalapati, BhanuSree Yalamanchili, Koteswara Rao Anne

An Extended Chameleon Algorithm for Document Clustering 335
G. Veena, N.K. Lekha

User Feedback Based Evaluation of a Product Recommendation System Using Rank Aggregation Method 349
Shahab Saquib Sohail, Jamshed Siddiqui, Rashid Ali

Misalignment Fault Prediction of Motor-Shaft Using Multiscale Entropy and Support Vector Machine 359
Alok Kumar Verma, Somnath Sarangi, Mahesh Kolekar

A Learning Based Emotion Classifier with Semantic Text Processing . . . 371
Vajrapu Anusha, Banda Sandhya

An Empirical Study of Robustness and Stability of Machine Learning Classifiers in Software Defect Prediction 383
Arvinder Kaur, Kamaldeep Kaur

A Two-Stage Genetic *K*-Harmonic Means Method for Data Clustering 399
Anuradha D. Thakare, Chandrashkehar A. Dhote

Time-Efficient Tree-Based Algorithm for Mining High Utility Patterns 409
Chiranjeevi Manike, Hari Om

A Lexicon Pooled Machine Learning Classifier for Opinion Mining from Course Feedbacks 419
Rupika Dalal, Ismail Safhath, Rajesh Piryani, Divya Rajeswari Kappara, Vivek Kumar Singh

Quality Metrics for Data Warehouse Multidimensional Models with Focus on Dimension Hierarchy Sharing 429
Anjana Gosain, Jaspreeti Singh

A Method to Induce Indicative Functional Dependencies for Relational Data Model 445
Sandhya Harikumar, R. Reethima

Novel Research in the Field of Shot Boundary Detection – A Survey 457
Raahat Devender Singh, Naveen Aggarwal

Fuzzy Based Approach to Develop Hybrid Ranking Function for Efficient Information Retrieval 471
Ashish Saini, Yogesh Gupta, Ajay K. Saxena

Knowledge Transfer Model in Collective Intelligence Theory 481
Saraswathy Shamini Gunasekaran, Salama A. Mostafa, Mohd. Sharifuddin Ahmad

A Novel Way of Assigning Software Bug Priority Using Supervised Classification on Clustered Bugs Data 493
Neetu Goyal, Naveen Aggarwal, Maitreyee Dutta

Multi Objective Cuckoo Search Optimization for Fast Moving Inventory Items 503
Achin Srivastav, Sunil Agrawal

An Empirical Study of Some Particle Swarm Optimizer Variants for Community Detection 511
Anupam Biswas, Pawan Gupta, Mradul Modi, Bhaskar Biswas

Evaluation of Data Warehouse Quality from Conceptual Model Perspective 521
Rakhee Sharma, Hunny Gaur, Manoj Kumar

Enhancing Frequency Based Change Proneness Prediction Method Using Artificial Bee Colony Algorithm 535
Deepa Godara, Rakesh Kumar Singh

Formulating Dynamic Agents' Operational State via Situation Awareness Assessment 545
Salama A. Mostafa, Mohd. Sharifuddin Ahmad, Muthukkaruppan Annamalai, Azhana Ahmad, Saraswathy Shamini Gunasekaran

An Intelligent Modeling of Oil Consumption 557
Haruna Chiroma, Sameem Abdulkareem, Sanah Abdullahi Muaz, Adamu I. Abubakar, Edi Sutoyo, Mungad Mungad, Younes Saadi, Eka Novita Sari, Tutut Herawan

Design and Implementation of a Novel Eye Gaze Recognition System Based on Scleral Area for MND Patients Using Video Processing 569
Sudhir Rao Rupanagudi, Varsha G. Bhat, R. Karthik, P. Roopa, M. Manjunath, Glenn Ebenezer, S. Shashank, Hrishikesh Pandith, R. Nitesh, Amrit Shandilya, P. Ravithej

Correlation Based Anonymization Using Generalization and Suppression for Disclosure Problems 581
Amit Thakkar, Aashiyana Arifbhai Bhatti, Jalpesh Vasa

Combining Different Differential Evolution Variants in an Island Based Distributed Framework–An Investigation 593
Shanmuga Sundaram Thangavelu, C. Shunmuga Velayutham

Word Sense Disambiguation for Punjabi Language Using Overlap Based Approach 607
Preeti Rana, Parteek Kumar

Flipped Labs as a Smart ICT Innovation: Modeling Its Diffusion among Interinfluencing Potential Adopters 621
Raghu Raman

Inquiry Based Learning Pedagogy for Chemistry Practical Experiments Using OLabs 633
Prema Nedungadi, Prabhakaran Malini, Raghu Raman

New Approach for Function Optimization: Amended Harmony Search 643
Chhavi Gupta, Sanjeev Jain

Multiobjective Mixed Model Assembly Line Balancing Problem 655
Sandeep Choudhary, Sunil Agrawal

Author Index 665