

# **Advances in Intelligent Systems and Computing**

Volume 265

*Series editor*

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

For further volumes:

<http://www.springer.com/series/11156>

## *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](mailto:nikhil@isical.ac.in)

### Members

Rafael Bello, Universidad Central “Marta Abreu” de Las Villas, Santa Clara, Cuba  
e-mail: [rbellop@uclv.edu.cu](mailto:rbellop@uclv.edu.cu)

Emilio S. Corchado, University of Salamanca, Salamanca, Spain  
e-mail: [escorchado@usal.es](mailto:escorchado@usal.es)

Hani Hagras, University of Essex, Colchester, UK  
e-mail: [hani@essex.ac.uk](mailto:hani@essex.ac.uk)

László T. Kóczy, Széchenyi István University, Győr, Hungary  
e-mail: [koczy@sze.hu](mailto:koczy@sze.hu)

Vladik Kreinovich, University of Texas at El Paso, El Paso, USA  
e-mail: [vladik@utep.edu](mailto:vladik@utep.edu)

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

Jie Lu, University of Technology, Sydney, Australia  
e-mail: [Jie.Lu@uts.edu.au](mailto:Jie.Lu@uts.edu.au)

Patricia Melin, Tijuana Institute of Technology, Tijuana, Mexico  
e-mail: [epmelin@hafsamx.org](mailto:epmelin@hafsamx.org)

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

Ngoc Thanh Nguyen, Wroclaw University of Technology, Wroclaw, Poland  
e-mail: [Ngoc-Thanh.Nguyen@pwr.edu.pl](mailto:Ngoc-Thanh.Nguyen@pwr.edu.pl)

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

Sirapat Boonkrong · Herwig Unger  
Phayung Meesad  
Editors

# Recent Advances in Information and Communication Technology

Proceedings of the 10th International  
Conference on Computing and  
Information Technology (IC<sup>2</sup>IT2014)

 Springer

*Editors*

Sirapat Boonkrong  
Faculty of Information Technology  
King Mongkut's University of Technology  
North Bangkok  
Bangkok  
Thailand

Phayung Meesad  
Faculty of Information Technology  
King Mongkut's University of Technology  
North Bangkok  
Bangkok  
Thailand

Herwig Unger  
Communication Networks  
University of Hagen  
Hagen  
Germany

ISSN 2194-5357                      ISSN 2194-5365 (electronic)  
ISBN 978-3-319-06537-3            ISBN 978-3-319-06538-0 (eBook)  
DOI 10.1007/978-3-319-06538-0  
Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2014936765

© Springer International Publishing Switzerland 2014

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

This volume contains the papers of the 10<sup>th</sup> International Conference on Computing and Information Technology (IC<sup>2</sup>IT2014). IC<sup>2</sup>IT is an annual conference, which is held in conjunction with the National Conference on Computing and Information Technology (NCCIT), one of the leading Thai national events in the area of Computer Science and Engineering. IC<sup>2</sup>IT provides a venue for the presentation and discussion of current research in the field of computing and information technology.

IC<sup>2</sup>IT2014 took place between 8<sup>th</sup> and 9<sup>th</sup> May at Angsana Laguna, Phuket, Thailand. This is the first time that the conference is located in the South of Thailand. Following the interests of our participants of the last events, IC<sup>2</sup>IT2014 proceedings has been structured into five main tracks: Data Mining Algorithms and Methods, Application of Data Mining, Infrastructures and Performance, Text Analysis and Search, and Security. Also, we are delighted to announce that the conference got a large financial support by the Thai government with the aim of encouraging and improving research in the ASEAN countries.

Although the support for the development of ASEAN and AEC (ASEAN Economic Community) are in the focus of the conference, the committee received 96 submissions from authors of 25 countries at 5 continents. The stable number of contributions over the last years is an indicator that our event is well established in the scientific community; with respect to the exploding number of conferences we are proud on that in particular. As usual, each submission was reviewed by at least 2-4 members of the program committee to avoid contradictory results. On these suggestions, the committee decided to accept 32 papers for oral presentation and inclusion in the conference proceedings.

Again, Springer agreed to publish our proceedings in its well-established and world-wide distributed series on Advances in Intelligent Systems and Computing. Last but not least, two internationally well-known scientists, from Germany and Japan, have been invited and accepted to give keynote talks to our participants.

A special thank is given to KMUTNB and its President, Professor Dr. Teeravuti Boonyasopon for his support of our conference from the first year on, and for providing us with a lot of resources from KMUTNB. We hope that IC<sup>2</sup>IT again provides great opportunities for academic staff, students and researchers to present their work. IC<sup>2</sup>IT is also a platform for exchange of knowledge in the field of computer and information

technology and shall inspire researchers to generate new ideas and findings and meet partners for future collaboration. We also hope that our participants use this occasion to learn more about Phuket and its beautiful scenery, people, culture and visit its famous beaches before or after the conference.

We would also like to thank all authors for their submissions and the members of the program committee for their great work and valuable time. The staff members of the Faculty of Information Technology at King Mongkut's University of Technology North Bangkok have done a lot of technical and organisational works. A very special and warm thank you is given to our web masters: Mr. Jeerasak Numpradit, and Mr. Armornsak Armornthananun. Without the meticulous work of Ms. Watchareewan Jitsakul the proceedings could not have been completed in the needed form at the right time.

After so much preparation, all of the organisers of course hope and wish that IC<sup>2</sup>IT2014 will again be a successful event and will be remembered by the participants for a long time.

February 27, 2014  
Bangkok

Sirapat Boonkrong  
Herwig Unger  
Phayung Meesad

# Organization



## **In Cooperation with**

King Mongkut's University of Technology North Bangkok (KMUTNB)

FernUniversität in Hagen, Germany (FernUni)

Chemnitz University, Germany (CUT)

Oklahoma State University, USA (OSU)

Edith Cowan University, Western Australia (ECU)

Hanoi National University of Education, Vietnam (HNUE)

Gesellschaft für Informatik (GI)

Maharakham University (MSU)

Ubon Ratchathani University (UBU)

Kanchanaburi Rajabhat University (KRU)

Nakhon Pathom Rajabhat University (NPRU)

Maharakham Rajabhat University (RMU)

Rajamangala University of Technology Lanna (RMUTL)

Rajamangala University of Technology Krungthep (RMUTK)

Rajamangala University of Technology Thanyaburi (RMUTT)

Prince of Songkla University, Phuket Campus (PSU)

National Institute of Development Administration (NIDA)

Council of IT Deans of Thailand (CITT)

## IC<sup>2</sup>IT 2014 Organizing Committee

Conference Chair

Phayung Meesad, KMUTNB, Thailand

Technical Program Committee

Chair

Herwig Unger, FernUni, Germany

Secretary and Publicity Chair

Sirapat Boonkrong, KMUTNB, Thailand



## Program Committee

M. Aiello

RUG, The Netherlands

T. Anwar

UTM, Malaysia

T. Bernard

Syscom CReSTIC, France

W. Bodhisuwan

KU, Thailand

A. Bui

Uni Paris 8, France

T. Böhme

TU Ilmenau, Germany

M. Caspar

CUT, Germany

P. Chavan

MMMP, India

T. Chintakovid

KMUTNB, Thailand

H. K. Dai

OSU, USA

D. Delen

OSU, USA

N. Ditcharoen

URU, Thailand

T. Eggendorfer

HdP Hamburg, Germany

R. Gumzej

Uni Maribor, Slovenia

H. C. Ha

HNUE, Vietnam

M. Hagan

OSU, USA

P. Hannay

ECU, Australia

W. Hardt

Chemnitz, Germany

C. Haruechaiyasak

NECTEC, Thailand

S. Hengpraprom

NPRU, Thailand

K. Hengpraprom

NPRU, Thailand

U. Inyaem

RMUTT, Thailand

M. Johnstone

ECU, Australia

T. Joochim

URU, Thailand

J. Kacprzyk

PAS, Poland



A. Kongthon	NECTEC, Thailand
S. Krootjohn	KMUTNB, Thailand
P. Kropf	Uni Neuchatel, Switzerland
M. Kubek	FernUni, Germany
S. Kukanok	MRU, Thailand
G. Kulkarni	MMMP, India
K. Kyamakya	Klagenfurt, Austria
J. Laokietkul	CRU, Thailand
U. Lechner	UniBw, Germany
M. Lohakan	KMUTNB, Thailand
J. Lu	UTS, Australia
A. Mikler	UNT, USA
A. Mingkhwan	KMUTNB, Thailand
C. Namman	URU, Thailand
P. P. NaSakolnakorn	MRU, Thailand
C. Netramai	KMUTNB, Thailand
K. Nimkerdphol	RMUTT, Thailand
S. Nitsuwat	KMUTNB, Thailand
S. Nuanmeesri	RSU, Thailand
N. Porrawatpreyakorn	KMUTNB, Thailand
P. Prathombutr	NECTEC, Thailand
A. Preechayasomboon	NECTEC, Thailand
P. Saengsiri	TISTR, Thailand
P. Sanguansat	PIM, Thailand
R. Shelke	MMMP, India
S. Smanchat	KMUTNB, Thailand
M. Sodanil	KMUTNB, Thailand
S. Sodsee	KMUTNB, Thailand
B. Soiraya	NPRU, Thailand
T. Srikhacha	TOT, Thailand
W. Sriurai	URU, Thailand
P. Sukjit	FernUni, Germany
D.H. Tran	HNUE, Vietnam
K. Treeprapin	UBU, Thailand
D. Tutsch	Uni Wuppertal, Germany
N. Utakrit	KMUTNB, Thailand
C. Valli	ECU, Australia
M. Weiser	OSU, USA
N. Wisitpongphan	KMUTNB, Thailand
A. Woodward	ECU, Australia
K. Woraratpanya	KMITL, Thailand
P. Wuttidittachotti	KMUTNB, Thailand

# Contents

## Invited Paper

<b>Wireless Mesh Networks and Cloud Computing for Real Time Environmental Simulations</b> .....	1
<i>Peter Kropf, Eryk Schiller, Philip Brunner, Oliver Schilling, Daniel Hunkeler, Andrei Lapin</i>	

## Session 1: Data Mining Algorithms and Methods

<b>Attribute Reduction Based on Rough Sets and the Discrete Firefly Algorithm</b> .....	13
<i>Nguyen Cong Long, Phayung Meesad, Herwig Unger</i>	
<b>A New Clustering Algorithm Based on Chameleon Army Strategy</b> .....	23
<i>Nadjet Kamel, Rafik Boucheta</i>	
<b>A Modified Particle Swarm Optimization with Dynamic Particles Re-initialization Period</b> .....	33
<i>Chiabwoot Ratanavilisagul, Boontee Kruatrachue</i>	
<b>An Ensemble K-Nearest Neighbor with Neuro-Fuzzy Method for Classification</b> .....	43
<i>Kaochiem Saetern, Narissara Eiamkanitchat</i>	
<b>A Modular Spatial Interpolation Technique for Monthly Rainfall Prediction in the Northeast Region of Thailand</b> .....	53
<i>Jesada Kajornrit, Kok Wai Wong, Chun Che Fung</i>	
<b>On N-term Co-occurrences</b> .....	63
<i>Mario Kubek, Herwig Unger</i>	
<b>Variable Length Motif-Based Time Series Classification</b> .....	73
<i>Myat Su Yin, Songsri Tangsripairoj, Benjarath Pupaacdi</i>	

**Session 2: Application of Data Mining**

**Adaptive Histogram of Oriented Gradient for Printed Thai Character Recognition** ..... 83  
*Kuntpong Woraratpanya, Taravichet Titijaronroj*

**A Comparative Machine Learning Algorithm to Predict the Bone Metastasis Cervical Cancer with Imbalance Data Problem** ..... 93  
*Kasama Dokduang, Sirapat Chiewchanwattana, Khamron Sunat, Vorachai Tangvoraphonkchai*

**Genetic Algorithm Based Prediction of an Optimum Parametric Combination for Minimum Thrust Force in Bone Drilling** ..... 103  
*Rupesh Kumar Pandey, Sudhansu Sekhar Panda*

**The Evolutionary Computation Video Watermarking Using Quick Response Code Based on Discrete Multiwavelet Transformation** ..... 113  
*Mahasak Ketcham, Thittaporn Ganokratanaa*

**Mining N-most Interesting Multi-level Frequent Itemsets without Support Threshold** ..... 125  
*Sorapol Chompaisal, Komate Amphawan, Athasit Surarerks*

**Dominant Color-Based Indexing Method for Fast Content-Based Image Retrieval** ..... 135  
*Ahmed Talib, Massudi Mahmuddin, Husniza Husni, Loay E. George*

**A Pilot Study on the Effects of Personality Traits on the Usage of Mobile Applications: A Case Study on Office Workers and Tertiary Students in the Bangkok Area** ..... 145  
*Charnsak Srisawatsakul, Gerald Quirchmayr, Borworn Papasratorn*

**Intelligent Echocardiographic Video Analyzer Using Parallel Algorithms** ..... 157  
*S. Nandagopalan, T.S.B. Sudarshan, N. Deepak, N. Pradeep*

**Durian Ripeness Striking Sound Recognition Using N-gram Models with N-best Lists and Majority Voting** ..... 167  
*Rong Phoophuangpairoj*

**Session 3: Infrastructures and Performance**

**An Exploratory Study on Managing Agile Transition and Adoption** ..... 177  
*Taghi Javdani Gandomani, Hazura Zulzalil, Azim Abd Ghani, Abu Bakar Md. Sultan, Khaironi Yatim Sharif*

**A Learning Automata-Based Version of SG-1 Protocol for Super-Peer Selection in Peer-to-Peer Networks** ..... 189  
*Shahrbanoo Gholami, Mohammad Reza Meybodi, Ali Mohammad Saghiri*

<b>A New Derivative of Midimew-Connected Mesh Network</b> . . . . .	203
<i>Md. Rabiul Awal, M.M. Hafizur Rahman, Rizal Bin Mohd Nor, Tengku Mohd. Bin Tengku Sembok, Yasuyuki Miura</i>	
<b>Modeling of Broadband over In-Door Power Line Network in Malaysia</b> . . . .	213
<i>Kashif Nisar, Wan Rozaini Sheik Osman, Abdallah M.M. Altrad</i>	
<b>Improving Performance of Decision Trees for Recommendation Systems by Features Grouping Method</b> . . . . .	223
<i>Supachanun Wanapu, Chun Che Fung, Jesada Kajornrit, Suphakit Niwattanakula, Nisachol Chamnongsria</i>	
<b>Improving Service Performance in Cloud Computing with Network Memory Virtualization</b> . . . . .	233
<i>Chandarasageran Natarajan</i>	
<b>Session 4: Text Analysis and Search</b>	
<b>Tweet! – And I Can Tell How Many Followers You Have</b> . . . . .	245
<i>Christine Klotz, Annie Ross, Elizabeth Clark, Craig Martell</i>	
<b>PDSearch: Using Pictures as Queries</b> . . . . .	255
<i>Panchalee Sukjit, Mario Kubek, Thomas Böhme, Herwig Unger</i>	
<b>Reducing Effects of Class Imbalance Distribution in Multi-class Text Categorization</b> . . . . .	263
<i>Part Pramokchon, Punpiti Piamsa-nga</i>	
<b>Towards Automatic Semantic Annotation of Thai Official Correspondence: Leave of Absence Case Study</b> . . . . .	273
<i>Siraya Sitthisarn, Bukhoree Bahoh</i>	
<b>Semantic Search Using Computer Science Ontology Based on Edge Counting and N-Grams</b> . . . . .	283
<i>Thanyaporn Boonyoung, Anirach Mingkhwan</i>	
<b>LORecommendNet: An Ontology-Based Representation of Learning Object Recommendation</b> . . . . .	293
<i>Noppamas Pukkhem</i>	
<b>Session 5: Security</b>	
<b>Secure Cloud Computing</b> . . . . .	305
<i>Wolfgang A. Halang, Maytiyanin Komkhao, Sunantha Sodsee</i>	
<b>Enhanced Web Log Cleaning Algorithm for Web Intrusion Detection</b> . . . . .	315
<i>Yew Chuan Ong, Zuraini Ismail</i>	

<b>Possible Prime Modified Fermat Factorization: New Improved Integer Factorization to Decrease Computation Time for Breaking RSA</b> .....	325
<i>Kritsanapong Somsuk, Sumonta Kasemvilas</i>	
<b>N-Gram Signature for Video Copy Detection</b> .....	335
<i>Paween Khoenkaw, Punpiti Piamsa-nga</i>	
<b>Author Index</b> .....	345