

**Communications  
in Computer and Information Science      304**

De-Shuang Huang Phalguni Gupta  
Xiang Zhang Prashan Premaratne (Eds.)

# Emerging Intelligent Computing Technology and Applications

8th International Conference, ICIC 2012  
Huangshan, China, July 25-29, 2012  
Proceedings

Volume Editors

De-Shuang Huang  
Tongji University, Shanghai, China  
E-mail: dshuang@tongji.edu.cn

Phalguni Gupta  
Indian Institute of Technology Kanpur, India  
E-mail: pg@cse.iitk.ac.in

Xiang Zhang  
University of Louisville, KY, USA  
E-mail: xiang.zhang@louisville.edu

Prashan Premaratne  
University of Wollongong, NSW, Australia  
E-mail: prashan@uow.edu.au

ISSN 1865-0929  
ISBN 978-3-642-31836-8  
DOI 10.1007/978-3-642-31837-5  
Springer Heidelberg Dordrecht London New York

e-ISSN 1865-0937  
e-ISBN 978-3-642-31837-5

Library of Congress Control Number: 2012941672

CR Subject Classification (1998): I.2, I.4, H.3, F.1, I.5, H.4

© Springer-Verlag Berlin Heidelberg 2012

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, 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.

*Typesetting:* Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# Preface

The International Conference on Intelligent Computing (ICIC) was started to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, pattern recognition, image processing, bioinformatics, and computational biology. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems, and solutions related to the multifaceted aspects of intelligent computing.

ICIC 2012, held in Huangshan, China, July 25–29, 2012, constituted the 8th International Conference on Intelligent Computing. It built upon the success of ICIC 2011, ICIC 2010, ICIC 2009, ICIC 2008, ICIC 2007, ICIC 2006, and ICIC 2005 that were held in Zhengzhou, Changsha, China, Ulsan, Korea, Shanghai, Qingdao, Kunming, and Hefei, China, respectively.

This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was “Emerging Intelligent Computing Technology and Applications.” Papers focusing on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

ICIC 2012 received 753 submissions from 28 countries and regions. All papers went through a rigorous peer-review procedure and each paper received at least three review reports. Based on the review reports, the Program Committee finally selected 242 high-quality papers for presentation at ICIC 2012, of which 242 papers are included in three volumes of proceedings published by Springer: one volume of *Lecture Notes in Computer Science* (LNCS), one volume of *Lecture Notes in Artificial Intelligence* (LNAI), and one volume of *Communications in Computer and Information Science* (CCIS).

This volume of *Communications in Computer and Information Science* (CCIS) includes 73 papers.

The organizers of ICIC 2012, including Tongji University, made an enormous effort to ensure the success of the conference. We hereby would like to thank the members of the Program Committee and the referees for their collective effort in reviewing and soliciting the papers. We would like to thank Alfred Hofmann, executive editor from Springer, for his frank and helpful advice and guidance throughout and for his continuous support in publishing the proceedings. In particular, we would like to thank all the authors for contributing their papers. Without the high-quality submissions from the authors, the success of the

conference would not have been possible. Finally, we are especially grateful to the IEEE Computational Intelligence Society, the International Neural Network Society, and the National Science Foundation of China for their sponsorship.

May 2012

De-Shuang Huang  
Phalguni Gupta  
Xiang Zhang  
Prashan Premaratne

# ICIC 2012 Organization

## General Co-chairs

Changjun Jiang, China

Gary G. Yen, USA

## Steering Committee Chair

De-Shuang Huang, China

## Program Committee Co-chairs

Jianhua Ma, Japan

## Organizing Committee Co-chairs

Laurent Heutte, France

## Award Committee Chair

Duoqian Miao, China

## Publication Chair

Yang Xiang, China

## Workshop/Special Session Chair

Jihong Guan, China

## Special Issue Chair

Kang-Hyun Jo, Korea

## Tutorial Chair

Vitoantonio Bevilacqua, Italy

## International Liaison Chair

Juan Carlos Figueroa, Colombia

## Publicity Co-chairs

Michael Gromiha, India

## Exhibition Chair

Phalguni Gupta, India

## Organizing Committee

Prashan Premaratne, Australia

## Conference Secretary

Kyungsook Han, Korea

Ling Wang, China

Xiang Zhang, USA

Lei Zhang, China

Qiong Wu, China

Zhijun Ding, China

Hanli Wang, China

Yan Wu, China

Guo-Zheng Li, China

Fanhui Shi, China

Zhi-Yang Chen, China

## Program Committee

Khalid Mahmood Aamir, Italy  
Vasily Aristarkhov, Russian Federation  
Costin Badica, Romania  
Vitoantonio Bevilacqua, Italy  
Shuhui Bi, China  
Danail Bonchev, USA  
Stefano Cagnoni, Italy  
Chin-Chih Chang, Taiwan, China  
Pei-Chann Chang, Taiwan, China  
Jack Chen, Canada  
Shih-Hsin Chen, Taiwan, China  
Wen-Sheng Chen, China

Xiyuan Chen, China  
Yang Chen, China  
Ziping Chiang, Taiwan, China  
Michal Choras, Poland  
Angelo Ciaramella, Italy  
Milan Cisty, Slovakia  
Jose Alfredo F. Costa, Brazil  
Loganathan D., India  
Eng. Salvatore Distefano, Italy  
Mariagrazia Dotoli, Italy  
Karim Faez, Iran  
Jianbo Fan, China

Minrui Fei, China  
Wai-Keung Fung, Canada  
Jun-Ying Gan, China  
Xiao-Zhi Gao, Finland  
Dunwei Gong, China  
Valeriya Gribova, Russia  
M. Michael Gromiha, Japan  
Kayhan Gulez, Turkey  
Anyuan Guo, China  
Ping Guo, China  
Phalguni Gupta, India  
Fei Han, China  
Kyungsook Han, Korea  
Nojeong Heo, Korea  
Laurent Heutte, France  
Martin Holena, Czech Republic  
Wei-Chiang Hong, Taiwan, China  
Yuxian Hou, China  
Sanqing Hu, China  
Guangbin Huang, Singapore  
Peter Hung, Ireland  
Li Jia, China  
Zhenran Jiang, China  
Kang-Hyun Jo, Korea  
Dah-Jing Jwo, Taiwan, China  
Yoshiaki Kakuda, Japan  
Vandana Dixit Kaushik, India  
Muhammad Khurram Khan,  
Saudi Arabia  
Bora Kumova, Turkey  
Yoshinori Kuno, Japan  
Takashi Kuremoto, Japan  
Vincent C.S. Lee, Australia  
Bo Li, China  
Dalong Li, USA  
Guo-Zheng Li, China  
Shi-Hua Li, China  
Xiaoou Li, Mexico  
Hualou Liang, USA  
Honghuang Lin, USA  
Chunmei Liu, USA  
Chun-Yu Liu, USA  
Ju Liu, China  
Ke Lv, China  
Jinwen Ma, China  
Igor V. Maslov, Japan  
Xiandong Meng, USA  
Filippo Menolascina, Italy  
Pabitra Mitra, India  
Ravi Monaragala, Sri Lanka  
Tarik Veli Mumcu, Turkey  
Primiano Di Nauta, Italy  
Ben Niu, China  
Sim-Heng Ong, Singapore  
Vincenzo Pacelli, Italy  
Shaoning Pang, New Zealand  
Francesco Pappalardo, Italy  
Young B. Park, Korea  
Surya Prakash, India  
Prashan Premaratne, Australia  
Hong Qiao, China  
Daowen Qiu, China  
K.R. Seeja, India  
Ajita Rattani, Italy  
Angel D. Sappa, Spain  
Simon See, Singapore  
Akash K. Singh, USA  
Jiatao Song, China  
Qiankun Song, China  
Zhan-Li Sun, Singapore  
Stefano Squartini, Italy  
Evi Syukur, Australia  
Hao Tang, China  
Chuan-Kang Ting, Taiwan, China  
Jun Wan, USA  
Bing Wang, USA  
Jeen-Shing Wang, Taiwan, China  
Ling Wang, China  
Shitong Wang, China  
Xuesong Wang, China  
Yong Wang, China  
Yufeng Wang, China  
Zhi Wei, China  
Xiaojun Wu, China  
Junfeng Xia, USA  
Shunren Xia, China  
Bingji Xu, China  
Shao Xu, Singapore  
Zhenyu Xuan, USA  
Yu Xue, China

Tao Ye, China  
Jun-Heng Yeh, Taiwan, China  
Myeong-Jae Yi, Korea  
Zhi-Gang Zeng, China  
Boyun Zhang, China  
Chaoyang Joe Zhang, USA  
Lei Zhang, Hong Kong, China  
Rui Zhang, China

Xiaoguang Zhao, China  
Xing-Ming Zhao, China  
Zhongming Zhao, USA  
Bo-Jin Zheng, China  
Chun-Hou Zheng, China  
Fengfeng Zhou, China  
Waqas Haider Khan Bangyal, Pakistan  
Yuhua Qian, China

## Reviewers

Kezhi Mao  
Xin Hao  
Tarik Veli Mumcu  
Muharrem Mercimek  
Selin Ozcira  
Ximo Torres  
BinSong Cheng  
Shihua Zhang  
Yu Xue  
Xiaoping Luo  
Dingfei Ge  
Jiayin Zhou  
Mingyi Wang  
Chung Chang Lien  
Wei-Ling Hwang  
Jian Jia  
Jian Wang  
Zhiliu Zuo  
Sajid Bashir  
Faisal Mufti  
Hafiz Muhammad Farooq  
Bilal Ahmed  
Maryam Gul  
Gurkan Tuna  
Hajira Jabeen  
Chandana Gamage  
Prashan Premaratne  
Chathura R. De Silva  
Manodha Gamage  
Kasun De Zoysa  
Chesner Desir  
Laksman Jayaratne  
Francesco Camastra

Rémi Flamary  
Antoninostaiano Alessio Ferone  
Raffaele Montella  
Nalin Karunasinghe  
Vladislavs Dovgalecs  
Pierrick Tranouez  
Antonio Maratea  
Giuseppe Vettigli  
Ranga Rodrigo  
Chyuan-Huei Yang  
Rey-Sern Lin  
Cheng-Hsiung Chiang  
Jian-Shiun Hu  
Yao-Hong Tsai  
Hung-Chi Su  
J.-H. Chen  
Wen Ouyang  
Chong Shen  
Yuan Xu  
Cucocris Tano  
Tien-Dung Le  
Hee-Jun Kang  
Hong-Hee Lee  
Ngoc-Tung Nguyen  
Ju Kunru  
Vladimir Brusic  
Ping Zhang  
Renjie Zhang  
Alessandro Cincotti  
Mojaharul Islam  
Marzio Pennisi  
Haili Wang  
Santo Motta

Keun Ho Ryu	Takashi Kuremoto
Alfredo Pulvirenti	Amin Yazdanpanah
Rosalba Giugno	Meng-Cheng Lau
Ge Guo	Chi Tai Cheng
Chih-Min Lin	Jayanta Debnath
Yifeng Zhang	Raymond Ng
Xuefen Zhu	Baranyi Peter
Lvzhou Li	Yongping Zhai
Haozhen Situ	Baoquan Song
Qin Li	Weidi Dai
Nikola Paunkovic	Jiangzhen Ran
Paulo Mateus	Huiyu Jin
Jozef Gruska	Guoping Lu
Xiangfu Zou	Xiaohua Qiao
Yasser Omar	Xuemei Ren
Yin-Xiang Long	Mingxia Shen
Bjoern Schuller	Hao Tang
Erikcam Bria	Zhong-Qiang Wu
Faundez-Zanuy Marcos	Zhenhua Huang
Rui Zhang	Junlin Chang
Yibin Ye	Bin Ye
Qinglai Wei	Yong Zhang
Guangbin Huang	Yanzi Miao
Lendasse Amaury	Yindi Zhao
Michele Scarpiniti	Jun Zhao
Simone Bassis	Mei-Qiang Zhu
Morabito Carlo	Xue Xue
Amir Hussain	Yanjing Sun
Li Zhang	Waqas Haider Khan Bangyal
Emilio Soria	Ming-Feng Yang
Sanqing Hu	Guo-Feng Fan
Hossein Javaherian	Asma Nani
Veselin Stoyanov	Xiangtao Li
Eric Fock	Hongjun Jia
Yao-Nan Lien	Yehu Shen
Liangjun Xie	Tiantai Guo
Nong Gu	Liya Ding
Xuewei Wang	Dawen Xu
Shizhong Liao	Jinhe Wang
Zheng Liu	Xiangyu Wang
Bingjun Sun	Shihong Ding
Yuxian Hou	Zhao Wang
Shiping Wen	Junyong Zhai
Ailong Wu	Haibo Du
Gang Bao	Haibin Sun

Jun Yang  
Chin-Sheng Yang  
Jheng-Long Wu  
Jyun-Jie Lin  
Jun-Lin Lin  
Liang-Chih Yu  
S.H. Chen  
Chien-Lung Chan  
Eric Fan  
X.H. Cloud  
Yue Deng  
Kun Yang  
Badrinath Srinivas  
Francesco Longo  
Santo Motta  
Giovanni Merlini  
Shengjun Wen  
Ni Bu  
Changan Jiang  
Caihong Zhang  
Lihua Jiang  
Aihui Wang  
Cunchen Gao  
Tianyu Liu  
Pengfei Li  
Jing Sun  
Aimin Zhou  
Ji-Hui Zhang  
Xiufen Zou  
Lianghong Wu  
H. Chen  
Jian Cheng  
Zhihua Cui  
Xiao-Zhi Gao  
Guosheng Hao  
Quan-Ke Pan  
Bin Qian  
Xiaoyan Sun  
Byungjeong Lee  
Woochang Shin  
Jaewon Oh  
Jong-Myon Kim  
Yung-Keun Kwon  
Mingjian Zhang  
Xiai Yang

Lirong Wang  
Xi Luo  
Weidong Yang  
Weiling Liu  
Lanshen Guo  
Yunxia Qu  
Peng Kai  
Song Yang  
Xianxia Zhang  
Min Zheng  
Weiming Yu  
Wangjun Xiang  
Qing Liu  
Xi Luo  
Ali Ahmed Adam  
Ibrahim Aliskan  
Yusuf Altun  
Kadir Erkan  
Ilker Ustoglu  
Levent Ucun  
Janset Dasdemir  
Xiai Yan  
Stefano Ricciardi  
Daniel Riccio  
Marilena De Marsico  
Fabio Narducci  
Atsushi Yamashita  
Kazunori Onoguchi  
Ryuzo Okada  
Naghmeh Garmsiri  
Lockery Dan  
Maddahi Yaser  
Kurosh Zareinia  
Ramhuzaini Abd Rahman  
Xiaosong Li  
Lei Song  
Gang Chen  
Yiming Peng  
Fan Liu  
Jun Zhang  
Li Shang  
Chunhou Zheng  
Jayasudha John Suseela  
Soniya Balram  
K.J. Shanti

Aravindan Chandrabose	Lian Liu
Parul Agarwal	Mohammad Bagher Bannae Sharifian
Deepa Anand	Hadi Afsharirad
Ranjit Biswas	S. Galvani
Nobutaka Shimada	Chengdong Wu
Hironobu Fujiyoshi	Meiju Liu
Giuseppe Vettigli	Aamir Shahzad
Francesco Napolitano	Wei Xiong
Xiao Zhang	Toshiaki Kondo
Torres-Sospedra Joaquín	Andrea Prati
Kunikazu Kobayashi	Bai Li
Liangbing Feng	Domenico G. Sorrenti
Fuhai Li	Alessandro Rizzi
Yongsheng Dong	Raimondo Schettini
Shuyi Zhang	Mengjie Zhang
Yanqiao Zhu	Gustavo Olague
Lei Huang	Umarani Jayaraman
Yue Zhao	Aditya Nigam
Yunsheng Jiang	Hunny Mehrotra
Bin Xu	Gustavo Souza
Wei Wang	Guilherme Barreto
Jin Wei	Leandro dos Santos Coelho
Kisha Ni	Carlos Forster
Yu-Liang Hsu	Fernando Von Zuben
Che-Wei Lin	Anne Canuto
Jeen-Shing Wang	Jackson Souza
Yingke Lei	Carmelo Bastos Filho
Jie Gui	Daniel Aloise
Xiaoming Liu	Sergio P. Santos
Dong Yang	Ricardo Fabbri
Jian Yu	Fábio Paiva
Jin Gu	S.H. Chen
Chenghai Xue	Tsung-Che Chiang
Xiaowo Wang	Cheng-Hung Chen
Xin Feng	Shih-Hung Wu
Bo Chen	Zhifeng Yun
Jianwei Yang	Yanqing Ji
Chao Huang	Kai Wang
Weixiang Liu	Je-Ho Park
Qiang Huang	Junhong Wang
Yanjie Wei	Jifang Pang
Ao Li	Thiran De Silva
Mingyuan Jiu	Nalin Badara
Dipankar Das	Shaojing Fan
Gianluca Ippoliti	Chen Li

Qingfeng Li  
Liangxu Liu  
Rina Su  
Hua Yu  
Jie Sun  
Linhua Zhou  
Zhaohong Deng  
Pengjiang Qian  
Jun Wang  
Puneet Gupta  
Salim Flora  
Jayaputera James  
Sherchan Wanita  
Helen Paik  
Mohammed M. Gaber  
Agustinus B. Waluyo  
Dat Hoang  
Hamid Motahari  
Eric Pardede  
Tim Ho  
Jose A.F. Costa  
Qiang Fan  
Surya Prakash  
Vandana Dixit K.  
Saiful Islam  
Kamlesh Tiwari  
Sandesh Gupta  
Zahid Akhtar  
Min-Chih Chen  
Andreas Konstantinidis  
Quanming Zhao  
Hongchun Li  
Zhengjie Wang  
Chong Meng  
Lin Cai  
Aiyu Zhang  
Yang-Won Lee  
Young Park  
Chulantha Kulasekere  
Akalanka Ranundeniya  
Junfeng Xia  
Min Zhao  
Hamid Reza Rashidi Kanan  
Mehdi Ezoji  
Majid Ziaratban  
Saeed Mozaffari  
Javad Haddadnia  
Peyman Moallem  
Farzad Towhidkhah  
Hamid Abrishamimoghaddam  
Mohammad Reza Pourfard  
M.J. Abdollahi Fard  
Arana-Arexolaleiba Nestor  
Carme Julià  
Boris Vintimilla  
Daniele Ranieri  
Antonio De Giorgio  
Vito Gallo  
Leonarda Carnimeo  
Paolo Pannarale  
López-Chau Asdrúbal  
Jair Cervantes  
Debrup Chakraborty  
Simon Dacey  
Wei-Chiang Hong  
Wenyong Dong  
Lingling Wang  
Hongrun Wu  
Chien-Yuan Lai  
Md.Kamrul Hasan  
Mohammad Kaykobad  
Young-Koo Lee  
Sungyoung Lee  
Chin-Chih Chang  
Yuewang  
Shinji Inoue  
Tomoyuki Ohta  
Eitaro Kohno  
Alex Muscar  
Sorin Ilie  
Cosulschi Mirel  
Min Chen  
Wen Yu  
Lopez-Arevalo Ivan  
Sabooth Ajaz  
Prashan Premaratne  
Weimin Huang  
Jingwen Wang  
Kai Yin  
Hong Wang

Yan Fan	Jiande Sun
Niu Qun	Hui Yuan
Youqing Wang	Qiang Wu
Dajun Du	Yannan Ren
Laurence T. Yang	Dianxing Liu
Laurence Yang	M. Sohel Rahman
Seng Loke	Dengxin Li
Syukur Evi	Gerard J. Chang
Luis Javier García Villalba	Weidong Chang
Tsutomu Terada	Xulian Hua
Tomas Sanchez Lopez	Dan Tang
Eric Cheng	Sandesh Gupta
Battenfeld Oliver	Uma Rani
Yokota Masao	Surya Prakash
Hanemann Sven	Narendra Kohli
Yue Suo	Meemee Ng
Pao-Ann Hsiung	Olesya Kazakova
Kristiansen Lill	Vasily Aristarkhov
Callaghan Victor	Ozgur Kaymakci
Mzamudio Rodriguez Victor	Xuesen Ma
Sherif Sakr	Qiyue Li
Rajiv Ranjan	Zhenchun Wei
Cheong Ghil Kim	Xin Wei
Philip Chan	Xiangjuan Yao
Wojtek Goscinski	Ling Wang
Jefferson Tan	Shujuan Jiang
Bo Zhou	Changhai Nie
Huiwei Wang	He Jiang
Xiaofeng Chen	Fengfeng Zhou
Bing Li	Zexian Liu
Wojtek Goscinski	Jian Ren
Samar Zutshi	Xinjiao Gao
Rafal Kozik	Tian-Shun Gao
Tomasz Andrysiak	Han Cheng
Marian Cristian Mihaescu	Yongbo Wang
Michal Choras	Yuangen Yao
Yanwen Chong	Juan Liu
Jinxing Liu	Bing Luo
Miguel Gonzalez Mendoza	Zilu Ying
Ta-Yuan Chou	Junying Zeng
Hui Li	Guohui He
Chao Wu	Yikui Zhai
Kyung DaeKo	Binyu Yi
Junhong Wang	Zhan Liu
Guoping Lin	Xiang Ji

Hongyuan Zha  
Azzedine Boukerche  
Horacio A.B.F. Oliveira  
Eduardo F. Nakamura  
Antonio A. F. Loureiro  
Radhika Nagpal  
Jonathan Bachrach  
Daeyoung Choi  
Woo Yul Kim  
Amelia Badica  
Fuqing Duan  
Hui-Ping Tserng  
Ren-Jye Dzeng  
Machine Hsie  
Milan Cisty  
Muhammad Amjad  
Muhammad Rashid  
Waqas Bangyal  
Bo Liu  
Xueping Yu  
Chenlong Liu  
Jikui Shen  
Julius Wan  
Linlin Shen  
Zhou Su  
Weiyan Hou  
Emil Vassev  
Anuparp Boonsongsrikul  
Paddy Nixon  
Kyung-Suk Lhee  
Man Pyo Hong  
Vincent C.S. Lee  
Yee-Wei Law  
Touraj Banirostam  
Ho-Quoc-Phuong Nguyen  
Bin Ye  
Huijun Li  
Xue Sen  
Mu Qiao  
Xuesen Ma  
Weizhen Chun  
Qian Zhang  
Baosheng Yang  
Xuanfang Fei  
Fanggao Cui  
Xiaoning Song  
Dongjun Yu  
Bo Li  
Huaijiang Shao  
Ke Gu  
Helong Xiao  
Wensheng Tang  
Andrey Vavilin  
Jong Eun Ha  
Mun-Ho Jeong  
Taeho Kim  
Kaushik Deb  
Daenyeong Kim  
Dongjoong Kang  
Hyun-Deok Kang  
Hoang-Hon Trinh  
Andrey Yakovenko  
Dmitry Brazhkin  
Sergey Ryabinin  
Stanislav Efremov  
Andrey Maslenikov  
Oleg Sklyarov  
Pabitra Mitra  
Juan Li  
Tiziano Politi  
Vitoantonio Bevilacqua  
Abdul Rauf  
Yuting Yang  
Lei Zhao  
Shih-Wei Lin  
Vincent Li  
Chunlu Lai  
Qian Wang  
Liuzhao Chen  
Xiaozhao Zhao  
Plaban Bhowmick  
Anupam Mandal  
Biswajit Das  
Pabitra Mitra  
Tripti Swarnkar  
Yang Dai  
Chao Chen  
Yi Ma  
Emmanuel Camdes  
Chenglei Sun

Yinying Wang	Ling Wang
Jiangning Song	Huizhong Yang
Ziping Chiang	Ning Li
Vincent Chiang	Tao Ye
Xingming Zhao	Smile Gu
Chenglei Sun	Phalguni Gupta
Francesca Nardone	Guangxu Jin
Angelo Ciaramella	Huijia Li
Alessia Albanese	Xin Gao
Francesco Napolitano	Dan Liu
Guo-Zheng Li	Zhenyu Xuan
Xu-Ying Liu	Changbin Du
Dalong Li	Mingkun Li
Jonathan Sun	Haiyun Zhang
Nan Wang	Baoli Wang
Yi Yang	Giuseppe Pappalardo
Mingwei Li	Huisen Wang
Wierzbicki Adam	Hai Min
Marcin Czenko	Nalin Bandara
Ha Tran	Lin Zhu
Jeroen Doumen	Wen Jiang
Sandro Etalle	Can-Yi Lu
Pieter Hartel	Lei Zhang
Jerryden Hartog	Jian Lu
Hai Ren	Jian Lu
Xiong Li	Hong-Jie Yu
Ling Liu	Ke Gu
Félix Gómez Mármlol	Hangjun Wang
Jih-Gau Juang	Zhi-De Zhi
He-Sheng Wang	Xiaoming Ren
Xin Lu	Ben Niu
Kyung-Suk Lhee	Hua-Yun Chen
Sangyoon Oh	Fuqing Duan
Chisa Takano	Jing Xu
Sungwook S. Kim	Marco Falagario
Junichi Funasaka	Fabio Sciancalepore
Yoko Kamidoi	Nicola Epicoco
Dan Wu	Wei Zhang
Dah-Jing Jwo	Mu-Chung Chen
Abdollah Shidfar	Chinyuan Fan
Reza Pourgholi	Chun-Wei Lin
Xiujun Zhang	Chun-Hao Chen
Yan Wang	Lien-Chin Chen
Kun Yang	Seiki Inoue
Iliya Slavutin	K.R. Seeja

Gurkan Tuna  
Cagri Gungor  
Qian Zhang  
Huanting Feng  
Boyuan Zhang  
Jun Qin  
Yang Zhao  
Qinghua Cui  
Hsiao Piau Ng  
Qunfeng Dong  
Hailei Zhang  
Woochang Hwang  
Joe Zhang  
Marek Rodny  
Bing-Nan Li  
Yee-Wei Law  
  
Lu Zhen  
Bei Ye  
Jl Xu  
Pei-Chann Chang  
Valeria Gribova  
Xiandong Meng  
Lasantha Meegahapola  
Angel Sappa  
Rajivmal Hotra  
George Smith  
Carlor Ossi  
Lijing Tan  
Antonio Puliafito  
Nojeong Heo  
Santosh Bbehera  
Giuliana Rotunno

# Table of Contents

## Neural Networks

Oscillation Analysis for a Recurrent Neural Network Model with Distributed Delays .....	1
<i>Chunhua Feng and Zhenkun Huang</i>	
Minimum Risk Neural Networks and Weight Decay Technique .....	10
<i>I-Cheng Yeh, Pei-Yen Tseng, Kuan-Chieh Huang, and Yau-Hwang Kuo</i>	
Time Series Forecasting Using Restricted Boltzmann Machine .....	17
<i>Takashi Kuremoto, Shinsuke Kimura, Kunikazu Kobayashi, and Masanao Obayashi</i>	
Interactive Evolutionary Algorithms with Decision-Makers Preferences for Solving Interval Multi-objective Optimization Problems .....	23
<i>Dunwei Gong, Xinfang Ji, Jing Sun, and Xiaoyan Sun</i>	

## Particle Swarm Optimization and Niche Technology

Precipitation Control for Mixed Solution Based on Fuzzy Adaptive Robust Algorithm .....	30
<i>Hongjun Duan, Fengwen Wang, and Silong Peng</i>	
B-Spline Neural Networks Based PID Controller for Hammerstein Systems .....	38
<i>Xia Hong, Serdar Iplikci, Sheng Chen, and Kevin Warwick</i>	
Constrained Multi-objective Particle Swarm Optimization Algorithm ...	47
<i>Yue-lin Gao and Min Qu</i>	
A Particle Swarm Optimization Using Local Stochastic Search for Continuous Optimization .....	56
<i>Jianli Ding, Jin Liu, Yun Wang, Wensheng Zhang, and Wenyong Dong</i>	

## Kernel Methods and Supporting Vector Machines

Component Random Walk .....	62
<i>Xiaohua Xu, Ping He, Lin Lu, Zhoujin Pan, and Ling Chen</i>	
Regularized Complete Linear Discriminant Analysis for Small Sample Size Problems .....	67
<i>Wuyi Yang</i>	

Unsupervised Feature Selection for Multi-cluster Data via Smooth Distributed Score .....	74
<i>Furui Liu and Xiyan Liu</i>	

Reinforcement Learning Based on Extreme Learning Machine .....	80
<i>Jie Pan, Xuesong Wang, Yuhu Cheng, and Ge Cao</i>	

A Novel Multiple Kernel Clustering Method .....	87
<i>Lujiang Zhang and Xiaohui Hu</i>	

## Biology Inspired Computing and Optimization

A Comparative Study of Two Independent Component Analysis Using Reference Signal Methods .....	93
<i>Jian-Xun Mi and Yanxin Yang</i>	

A Novel Hybrid ACO/SA Approach to Solve Stochastic Dynamic Facility Layout Problem (SDFLP) .....	100
<i>T.S. Lee, Ghorbanali Moslemipour, T.O. Ting, and Dirk Rilling</i>	

ACO with Fuzzy Pheromone Laying Mechanism .....	109
<i>Liu Yu, Jian-Feng Yan, Guang-Rong Yan, and Lei Yi</i>	

Locating Tandem Repeats in Weighted Biological Sequences .....	118
<i>Hui Zhang, Qing Guo, and Costas S. Iliopoulos</i>	

Analysis of Flow Field in the Cylinder of Gasoline Engine before and after Being Turbocharged .....	124
<i>Hongjuan Ren, Yongxiang Tian, Qihua Ma, and Jiao Luo</i>	

## Knowledge Discovery and Data Mining

Spectrum Sensing Algorithms in the Cognitive Radio Network .....	132
<i>Yanbin Shi, Jian Guo, and Yuanfang Jian</i>	

Research on Information Fusion Method Based on sFlow and Netflow in Network Security Situation .....	139
<i>Yanbo Wang, Huiqiang Wang, Chengqin Han, Baoyu Ge, and Ming Yu</i>	

Discrete Exponential Bayesian Networks Structure Learning for Density Estimation .....	146
<i>Aida Jarraya, Philippe Leray, and Afif Masmoudi</i>	

A New Adaptive Signal Segmentation Approach Based on Hiaguchi's Fractal Dimension .....	152
<i>Hamed Azami, Alireza Khosravi, Milad Malekzadeh, and Saeid Sanei</i>	

## Intelligent Computing in Bioinformatics

Predicting Binding-Peptide of HLA-I on Unknown Alleles by Integrating Sequence Information and Energies of Contact Residues . . . . .	160
<i>Fei Luo, Yangyang Gao, Yongqiong Zhu, and Juan Liu</i>	
As <sup>3</sup> p: A Fast Algorithm to Search Structurally Similar Proteins . . . . .	166
<i>Satish Rohit, Ravichandran Akshaya, Radhakrishnan Sabarinathan, Marthandan Kirti Vaishnavi, Durairaj Sherlin, Manickam Gurusaran, and Kanagaraj Sekar</i>	
Identifying Characteristic Genes Based on Robust Principal Component Analysis . . . . .	174
<i>Chun-Hou Zheng, Jin-Xing Liu, Jian-Xun Mi, and Yong Xu</i>	
Protein Classification Using Random Walk on Graph . . . . .	180
<i>Xiaohua Xu, Lin Lu, Ping He, Zhoujin Pan, and Cheng Jing</i>	
Protein Molecular Function Prediction Based on the Phylogenetic Tree . . . . .	185
<i>Lu Jian</i>	
Efficient Mode of Action Identification by Support Vector Machine Regression . . . . .	191
<i>Vitoantonio Bevilacqua and Paolo Pannarale</i>	

## Intelligent Computing in Pattern Recognition

A New De-noising Method for Infrared Spectrum . . . . .	197
<i>Qingwei Gao, De Zhu, Yixiang Lu, and Dong Sun</i>	
A Novel Segmentation Algorithm of Fingerprint Images Based on Mean Shift . . . . .	203
<i>Zhe Xue, Tong Zhao, Min Wu, and Tiande Guo</i>	
A New Hybrid Method with Biomimetic Pattern Recognition and Sparse Representation for EEG Classification . . . . .	212
<i>Yanbin Ge and Yan Wu</i>	
Recognizing Complex Events in Real Movies by Audio Features . . . . .	218
<i>Ji-Xiang Du, Yi-Lan Guo, and Chuan-Min Zhai</i>	
Finger-Knuckle-Print Recognition Using Local Orientation Feature Based on Steerable Filter . . . . .	224
<i>Zichao Li, Kuanquan Wang, and Wangmeng Zuo</i>	
Nose Localization Based on Subclass Discriminant Analysis . . . . .	231
<i>Jiatao Song, Lihua Jia, Gang Xie, and Wei Wang</i>	

## Intelligent Computing in Image Processing

Research on the Interactive Display System Based on Multi-touch Technology.....	236
<i>Chang-Qing Yin, Bin Chen, and Ze-Liang Zhang</i>	
Very Large-Scale Image Retrieval Based on Local Features .....	242
<i>Chang-Qing Yin, Wei Mao, and Wei Jiang</i>	
A Continuous Skeletonization Method Based on Distance Transform....	251
<i>Ting-Qin Yan and Chang-Xiong Zhou</i>	
Key-Based Scrambling for Secure Image Communication .....	259
<i>Prashan Premaratne and Malin Premaratne</i>	
Infrared Face Temperature Normalization in Fourier Domain .....	264
<i>Zhihua Xie and Jie Zeng</i>	
Faster Computation of Non-zero Invariants from Graph Based Method.....	272
<i>Vazeerudeen Abdul Hameed and Siti Mariyam Shamsuddin</i>	
MutualCascade Method for Pedestrian Detection.....	280
<i>Yanwen Chong, Qingquan Li, Hulin Kuang, and Chun-Hou Zheng</i>	
Super-Resolution Restoration of MMW Image Using Sparse Representation Based on Couple Dictionaries .....	286
<i>Li Shang, Yan Zhou, Liu Tao, and Zhan-li Sun</i>	
New Structural Similarity Measure for Image Comparison .....	292
<i>Prashan Premaratne and Malin Premaratne</i>	

## Intelligent Computing in Computer Vision

Unmanned Aerial Vehicle-Aided Wireless Sensor Network Deployment System for Post-disaster Monitoring .....	298
<i>Gurkan Tuna, Tarik Veli Mumcu, Kayhan Gulez, Vehbi Cagri Gungor, and Hayrettin Erturk</i>	
Geometrically Bounded Singularities and Joint Limits Prevention of a Three Dimensional Planar Redundant Manipulator Using Artificial Neural Networks .....	306
<i>Samer Yahya, Mahmoud Moghavvemi, and Haider Abbas F. Almurib</i>	
Float Cascade Method for Pedestrian Detection .....	313
<i>Yanwen Chong, Qingquan Li, Hulin Kuang, and Chun-Hou Zheng</i>	

Particle Filter Based on Multiple Cues Fusion for Pedestrian Tracking .....	321
<i>Yanwen Chong, Rong Chen, Qingquan Li, and Chun-Hou Zheng</i>	

## **Intelligent Control and Automation**

Research on Information Dissemination in Urban Rail Transit Line Network .....	328
<i>Quan-Ye Han, Xiao-Ming Wang, and Jian-Wu Dang</i>	

Approximation to Linear Algebraic Transition System .....	336
<i>Zhiwei Zhang, Jin-Zhao Wu, and Hao Yang</i>	

Research on Mission Planning of Space-Based Observation Based on Particle Swarm Optimization Algorithm .....	344
<i>Bo-quan Li, Xu-zhi Li, Hong-fei Wang, and Juan Meng</i>	

Study of Electron Beam Welding Residual Stresses for Aluminum 99.60 .....	352
<i>Guifang Guo, Shiqiong Zhou, Li Hao, Zeguo Liu, and Wang Liang</i>	

Dam Management with Imperfect Models: Bayesian Model Averaging with and Neural Network Control .....	360
<i>Paul J. Darwen</i>	

## **Knowledge Representation/Reasoning and Expert Systems**

Research on Virus Detection Technology Based on Ensemble Neural Network and SVM .....	367
<i>Boyun Zhang, Jianping Yin, and Shulin Wang</i>	

Enhancing Forecasting Performance of Multivariate Time Series Using New Hybrid Feature Selection .....	373
<i>Roselina Sallehuddin, Siti Mariyam Shamsuddin, and Noorfa Haszlinna Mustafa</i>	

Porting Contiki Operating System to RIEST2430 .....	381
<i>Juan Wang, Wei Ma, and Dan Liu</i>	

A New Approach for Bayesian Classifier Learning Structure via K2 Algorithm .....	387
<i>Heni Bouhamed, Afif Masmoudi, Thierry Lecroq, and Ahmed Rebaï</i>	

The Architecture of Internet Software Environment for Creating Teachware with Virtual Reality .....	394
<i>Valeria Viktorovna Gribova and Leonid Aleksandrovich Fedorishev</i>	

## Special Session on Advances in Information Security 2012

An Efficient Image Database Encryption Algorithm .....	400
<i>Kamlesh Tiwari, Ehtesham Akhtar Siddiqui, and Phalguni Gupta</i>	
Iris Segmentation Using Improved Hough Transform.....	408
<i>Amit Bendale, Aditya Nigam, Surya Prakash, and Phalguni Gupta</i>	
Enhanced Steganographic Capacity Using Morphing Technique .....	416
<i>Saiful Islam, Ekram Khan, and Phalguni Gupta</i>	
Minutiae Based Geometric Hashing for Fingerprint Database .....	422
<i>J. Umarani, J. Viswanathan, Aman K. Gupta, and Phalguni Gupta</i>	

## Special Session on Protein and Gene Bioinformatics: Analysis, Algorithms and Applications

A Tracking Controller Using RBFNs for Closed-Chain Robotic Manipulators .....	428
<i>Tien Dung Le, Hee-Jun Kang, and Young-Soo Suh</i>	
Enhancing 3D Scene Models Based on Automatic Context Analysis and Optimization Algorithm .....	435
<i>My-Ha Le, Andrey Vavilin, and Kang-Hyun Jo</i>	
Inference of Target Gene Regulation via miRNAs during Cell Senescence by Using the MiRaGE Server.....	441
<i>Y.-h. Taguchi</i>	
Sequence Analysis and Discrimination of Amyloid and Non-amyloid Peptides .....	447
<i>M. Michael Gromiha, A. Mary Thangakani, Sandeep Kumar, and D. Velmurugan</i>	

Fast DNA Sequence Clustering Based on Longest Common Subsequence.....	453
<i>Youhei Namiki, Takashi Ishida, and Yutaka Akiyama</i>	

## Special Session on Soft Computing and Bio-inspired Techniques in Real-World Applications

A Diversity-Guided Hybrid Particle Swarm Optimization .....	461
<i>Fei Han and Qing Liu</i>	
A Voting Procedure Supported by a Neural Validity Classifier for Optic Disk Detection .....	467
<i>Leonarda Carnimeo, Anna Cinzia Benedetto, and Giuseppe Mastronardi</i>	

Using Artificial Neural Networks for Closed Loop Control of a Hydraulic Prosthesis for a Human Elbow.....	475
<i>Vitoantonio Bevilacqua, Mariagrazia Dotoli, Mario Massimo Foglia, Francesco Acciani, Giacomo Tattoli, and Marcello Valori</i>	
<b>Special Session on Bio-inspired Computing and Applications</b>	
Real Coded Feature Selection Integrated with Self-adaptive Differential Evolution Algorithm .....	481
<i>Zhigang Shang, Zhihui Li, and Jing Liang</i>	
Optimization Based on Bacterial Colony Foraging .....	489
<i>Wei Liu, Yunlong Zhu, Ben Niu, and Hanning Chen</i>	
Differential Evolution Based on Fitness Euclidean-Distance Ratio for Multimodal Optimization .....	495
<i>Jing Liang, Boyang Qu, Mao Xiaobo, and Tiejun Chen</i>	
Bacterial Colony Optimization: Principles and Foundations.....	501
<i>Ben Niu and Hong Wang</i>	
<b>Author Index .....</b>	507