Editors
Nikos Mastorakis
Valeri Mladenov
Zoran Bojkovic

Latest Advances in Information Science and Applications

- Proceedings of the 12th WSEAS International Conference on Applied Computer Science (ACS '12)
- Proceedings of the 1st International Conference on Computing, Information Systems and Communications (CISCO '12)
- Proceedings of the 1st International Conference on Digital Services, Internet and Applications (DSIA '12)

Singapore City, Singapore, May 11-13, 2012
LATEST ADVANCES in INFORMATION SCIENCE and APPLICATIONS

Proceedings of the 12th WSEAS International Conference on Applied Computer Science (ACS '12)

Proceedings of the 1st International Conference on Computing, Information Systems and Communications (CISCO '12)

Proceedings of the 1st International Conference on Digital Services, Internet and Applications (DSIA '12)

Singapore City, Singapore
May 11-13, 2012
LATEST ADVANCES in INFORMATION SCIENCE and APPLICATIONS

Proceedings of the 12th WSEAS International Conference on Applied Computer Science (ACS '12)

Proceedings of the 1st International Conference on Computing, Information Systems and Communications (CISCO '12)

Proceedings of the 1st International Conference on Digital Services, Internet and Applications (DSIA '12)

Singapore City, Singapore
May 11-13, 2012

Recent Advances in Computer Engineering Series | 3

Published by WSEAS Press
www.wseas.org

Copyright © 2012, by WSEAS Press

All the copyright of the present book belongs to the World Scientific and Engineering Academy and Society Press. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Editor of World Scientific and Engineering Academy and Society Press.

All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive. See also: http://www.worldses.org/review/index.html

ISSN: 1790-5109

World Scientific and Engineering Academy and Society
LATEST ADVANCES in
INFORMATION SCIENCE and
APPLICATIONS

Proceedings of the 12th WSEAS International Conference on Applied Computer Science (ACS '12)

Proceedings of the 1st International Conference on Computing, Information Systems and Communications (CISCO '12)

Proceedings of the 1st International Conference on Digital Services, Internet and Applications (DSIA '12)

Singapore City, Singapore
May 11-13, 2012
Editors:
Prof. Nikos E. Mastorakis, Technical University of Sofia, Bulgaria
Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria
Prof. Zoran Bojkovic, University of Belgrade, Serbia

International Program Committee Members:

Joseph Sifakis, France
Lotfi A. Zadeh, USA
Leon O. Chua, USA
K. R. Rao, USA
M. Kostic, USA
Alex Pentland, USA
Ruzena Bajcsy, USA
Perry Alexander, USA
Donald Bagert, USA
Jongmoon Baik, Korea
Tony Cowling, UK
Gregory Hislop, USA
Tom Horton, USA
Stan Jarzabek, Singapore
Timothy Lethbridge, Canada
Hareton Leung, Hong Kong
Michael Lutz, USA
Jim McDonald, USA
Ana Moreno, Spain
Shin Nakajima, Japan
J. Barrie Thompson, UK
Brian von Konsky, Australia
A. Venetsanopoulos, Canada
K. Benra, GERMANY
S. Sohrab, USA
Prof. Adrijan Baric, Croatia
Nadjib ACHIR, France

Antonio Rubiò, Spain
Atanas Gotchev, Finland
Gianluca Setti, Italy
Günhan Dündar, Turkey
Hakan Kuntman, Turkey
José Luis Ausín, Spain
Jose Silva-Martínez, USA
Juha Yli-Kaakinen, Finland
Lars-Erik Wernersson, Sweden
Marco Gilli, Italy
Mario Biey, Italy
Massimo Alioto, Italy
Dimitri Bertsekas, USA
Gerhard P. Fettweis, Germany
Borivoje Nikolic, USA
R. Bogdan Staszewski, The Netherlands
Markku Renfors, Finland
Biswa N. Datta, USA
Irwin Sandberg, USA
P. Pardalos, USA
A. Manikas, UK
Wasfy B. Mikhail, USA
Massimo Conti, Italy
Mikko Valkama, Finland
Ming-Dou Ker, Taiwan
Moncef Gabbouj, Finland
Olli Vainio, Finland
Orla Feely, Ireland
B. Ciciotti, Italy
David Bader, USA
Terry Braun, USA
David E. Breen, USA
A. Kaczorek, POLAND
Wlodzislaw Duch, POLAND
Sidney Burrus, USA
Leonid G. Kazovsky, USA
Georgios B. Giannakis, USA
Nikolaos G. Bourbakis, USA
Brian A. Barsky, USA
Tara ALI-YAHIYA, France
Akos Zarandy, Hungary
Terry Braun, USA
Ana Rusu, Sweden
Guy Pujolle, France
Michel Riguidel, France
Angel Rodriguez-Vázquez, Spain
Jussi Ryyänen, Finland
Lars Svensson, Sweden
Ryszard S. Choras, Poland
Jae Choi, USA
Edward J. Delp, USA
Ge Jin, USA
M. H. Kim, South Korea
Sean Mooney, USA
John Quackenbush, USA
Daniel Rubin, USA
Joel Saltz, USA
Y. Shin, South Korea
Alexandros Stamatakis, Switzerland
Ivona Brandic, Austria
Frédéric Desprez, France
Simon Dobson, UK
Ada Gavrilovska, USA
Keith Jeffery, UK
Dan Marinescu, USA
Omer Rana, UK
Ryan Riley, Qatar
Mikhail Smirnov, Germany
Jerrerson Tan, Australia
Albert Zomaya, Australia
Houman Houmayun, USA
Per Gunnar Kjeldsberg, Norway
Fadi Kurdihi, USA
Walid Najjar, USA
Salwa Nassar, Egypt
Preeti R. Panda, India
Calvin Ribbens, USA
Rishad A Shafik, UK
Christos Papadopoulos, USA
Mohamed Riduan Abid, Morocco
Josephine Antoniou, Cyprus
George Atia, USA
Ezedin Baraka, UAE
Ossi Mokryn, Israel
Andreas Pitsillides, Cyprus
Kamil Sarac, USA
Abd-Elhamid Taha, Canada
Zouheir Trabels, UAE
Jong-Kook Kim, Korea
Ishfaq Ahmad, USA
Yoongeun Choi, South Korea
Youngsun Han, South Korea
Alex Jones, USA
Sherif Khattab, Egypt
Hwangnam Kim, South Korea
Israel Koren, USA
Sangheon Pack, South Korea
Sanjay Ranka, USA
Sehyun Yang, South Korea
Dakai Zhu, USA
Ophir Frieder, USA
Aris Anagnostopoulos, Italy
Ranieri Baraglia, Italy
Luca Becchetti, Italy
Steve Beitzel, USA
Roi Blanco, Spain
Francesco Bonchi, Spain
Berkant Barla Cambazoglu, Spain
Rebecca Cathey, USA
Abdur Chowdhury, USA
Fabio Crestani, Switzerland
Debora Donato, USA
Bin Gao, China
Nazli Goharian, USA
Gregory Grefenstette, France
Stefano Leonardi, Italy
Claudio Lucchese, Italy
Salvatore Orlando, Italy
Iadh Ounis, UK
Gabriella Pasi, Italy
Raffaele Perego, Italy
Diego Puppin, USA
Greg Pfister, USA
Nicola Tonellotto, Italy
Rossano Venturini, Italy
Wai Gen Yee, USA
Jay Smith, USA
Chaker El Amrani, Morocco
Shoukat Ali, Ireland
Othmane Bouhalji, Qatar
Luis D. Briceno, USA
Florian Feldhaus, Germany
Stefan Freitag, Germany
Jaafar Gaber, France
Muthucumaru Maheswaran, Canada
Tomás Fernández Pena, Spain
Jerry Potter, USA
Francisco Fernández Rivera, Spain
John Antonio, USA
Amr Bayoumi, Egypt
Hazem Abbas, Egypt
Juergen Becker, Germany
Ali Elmorisy, UAE
Kris Gaj, USA
Benedict Gaster, USA
Reiner Hartenstein, Germany
Volodymyr Kindratenko, USA
José Nuñez-Yañez, UK
Marco Platzer, Germany
Viktor Prasanna, USA
Sridhar Radhakrishnan, USA
Mohamed Taher, Egypt
Monte Tull, USA
Vaidyanathan, USA
Brian F. Veale, USA
Jose Moreira, USA
Kaoutar El Maghraoui, USA
Houda Benbrahim, Morocco
Dalila Chiadmi, Morocco
Muhammad Elrabaab, Saudi Arabia
Houda lamhamed, USA
Gokul Kandiraju, USA
Hironori Kasahara, Japan
Emilio Luque, Spain
Ana Milanova, USA
Wolfgang Nagel, Germany
Liria Sato, Brazil  
Evan Speight, USA  
Carlos Varela, USA  
Wei-Jen Wang, Taiwan  
Lamia Yusuf, USA  
Ricky Kwok, China  
Moustafa Youssef, Egypt  
Nizar Al-Holou, USA  
Salah A. Aly, USA  
Yu Chen, USA  
Ahmed Hemly, USA  
Anura P. Jayasumana, USA  
Meilong Jiang, USA  
Ahmed Kamal, USA  
Zhen Kong, USA  
Vincent K. N. Lau, China  
Wing Cheong Lau, China  
Xiaohui Lin, China  
M. Yahya “Medy” Sanadidi, USA  
Chengwen Xing, China  
Mohammed Younis, USA  
M. Coates, Canada  
A. Chronopoulos, USA  
C. Elks, USA  
V. Ganesh, USA  
I. Gashi, UK  
A. Goldman, Brazil  
R. Guerraoui, Switzerland  
N. Hardavellas, USA  
H. Hellwagner, Austria  
B. Johnson, USA  
T. Kikuno, Japan  
C. Katsinis, USA  
Paavo Alku, Finland  
Péter Szolgay Pázmány, Hungary  
Piotr Dudek, UK  
Robert Bregovic, Finland  
Snorre Aune, Norway  
Stanislaw Pietrak, France  
Svante Signell, Sweden  
Tor Sverre Lande, Norway  
Yichuang Sun, UK  
Yong Lian, Singapore  
Yoshifumi Nishio, Japan  
Guohui Yao, USA  
Velayutham Pavanasam, India  
Nitish Gupta, India  
Ford Lumban Gaol, Indonesia  
Pallav Kumar Baruah, India

Additional Reviewers:
Al Emran Ismail  
Albert Lysko  
Alexandru Filip  
Alina Adriana Minea  
Álvaro Santos  
Amjad Mahmood  
Anabela Gomes  
Andrea Piras  
Andreas Veglis  
Andrey Dmitriev  
Ankit Patel  
Antigona Trofor  
Antonios S. Andreatos  
Arvind Dhingra  
Aw Yoke Cheng  
Badea Ana-Cornelia  
Balakrishnan Venkatalakshmi  
Belingher Daniel  
Bhagwati Prasad  
C. Girija Navaneedhan  
Calbureanu Popescu Madalina Xenia  
Catalin Ionut Silvestru  
Catalin Popescu  
Champion Wijaya  
Chandrasekaran Subramaniam  
Claudia-Georgeta Carstea  
Claudio Guarnaccia  
Daniela Litan  
Dario Assante  
David Vallejo  
Dhaval Vyas  
Dr. Shaikh Abdul Hannan  
Dzenana Donko  
Elena Zaitseva  
Emmanuel Lopez-Neri  
F.G. Lupianez  
Fernando Reinaldo Ribeiro  
Gabriel Badescu  
Gabriela Mircea  
Gabriella Bognar  
Gillich Gilbert-Rainer  
Giovanni Aiello  
Guoxiang Liu  
Gyorodi Cornelia  
Hanmin Jung  
Hsien-Lun Wong Alan  
Hugo Cruz-Suarez  
Hung-Jen Yang  
Igor Astrov  
Inácio Fonseca  
Ioan Susnea  
Jainshing Wu  
Jerzy Garus  
José A. Orosa  
José Metrólho  
Julián Pucheta  
Jussi Koskinen  
Jyoti Mahajan  
K K Mishra Mishra  
Karthikeyan Jayaraman  
Katerina Hyniova  
Kei Eguchi  
Kevin Kam Fung Yuen
Preface
This year the 12th WSEAS International Conference on Applied Computer Science (ACS '12),
the 1st International Conference on Computing, Information Systems and Communications
(CISCO '12) and the 1st International Conference on Digital Services, Internet and Applications
(DSIA '12) were held in Singapore City, Singapore, May 11-13, 2012. The conferences provided
a platform to discuss computers for education, distance learning, classroom monitoring,
education reforms, web-based education, educational software and development, privacy issues
for education, web-management of education, environment and educational technologies,
management of educational institutes, quality assurance in educational technologies etc. with
participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries,
allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be sent to
international indexes. They will be also available in the E-Library of the WSEAS. Extended
versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the
International Scientific Committee and the Reviewers for their excellent work in reviewing the
papers as well as their invaluable input and advice.

The Editors
Table of Contents

Plenary Lecture 1: Active Knowledge for the Control of Product Definition
Laszlo Horvath 15

Plenary Lecture 2: Computer Aided Diagnosis System for Early Detection of Breast Cancer
G. R. Sinha 16

Plenary Lecture 3: Engineering Complex Information Systems for Monitoring Health and the Environment
Giovanni De Micheli 17

Plenary Lecture 4: Conjugation of Artificial Neural Network and Geostatistics Approaches for Groundwater Modeling
Vahid Nourani 18

Plenary Lecture 5: Artificial Bee Colony (ABC) Algorithm Exploitation and Exploration Balance
Milan Tuba 19

Buyer Coalition Formation by Using Two Ant Colony Optimizations
Anon Sukstrienwong 21

A Case Study of Software Development for Memorandum Report System: MRS
Patravadee Vongsunedh, Anon Sukstrienwong 27

A Function Approximation in the Learning Value of a Function from Inaccurate Data
D. Poltem, K. Khompurngson, B. Novaprateep 32

Finding Consensus Clusters from Users' Preference Lists
Yen-Liang Chen, Wa-Wun Chen 37

The Application of Hide on Learning Problem with Data Error Measured with Square Loss and Different Error Tolerance
Boriboon Novaprateep, Kannika Khompurngson, Duangkamol Poltem 43

Mathematical Modeling for Stress Distribution Comparing Static and Dynamic Loads in Total Hip Arthroplasty
S. Srimongkol, S. Rattanamongkonkul, D. Poltem 47

Adding Assertion of System Composition for An Aspect-Oriented Approach
Paniti Netinant 52

A Delay-Differential Equations Model of Bone Formation and Resorption: Effect of Calcitonin
Wannapa Panitsupakamon, Chontita Rattanakul 58

A Mathematical Model of Bone Remodeling Process: Effects of Vitamin D and Time Delay
Chontita Rattanakul 64

Representation of Variables of Confined Turbulent Flow in a Region Close to the Wall
Sabah Tamimi 70
New Method of Knowledge Representation and Communication for Product Object Modeling
László Horváth, Imre J. Rudas

Adaptive Control of Approximately Modeled Freeway Traffic by Robust Fixed Point Transformations
József K. Tar, László Horváth, Imre J. Rudas, Teréz A. Várkonyi

A Case Study of Performance Improvement of Database System based on Distributed Processing
Sorapak Pukdesree

An Expansion Methods for Multivariate Fredholm Integral Equations
Boriboon Novaprateep, Khomsan Neamprem, Hideaki Kaneko

SEIQR-Network Model with Community Structure
S. Orankitjaroen, W. Jumpen, P. Boonkrong, B. Wiwatanapataphee, Y. H. Wu

Wavelet-based Feature Extraction of Rainfall-Runoff Process via Self-Organizing Map
Vahid Nourani, Masoumeh Parhizkar, Tohid Rezapour Khanghah, Aida Hosseini Baghanam, Elnaz Sharghi

ANN-based Groundwater Level Forecasting Employing SOM Clustering Approach
Vahid Nourani, Farnaz Daneshvar Vousoughi, Aida Hosseini Baghanam, Mohammad Taghi Alami

Applying Digitizing Technique on the Historical Reflection of the POP Album Cover from 1970 to 2000 in Taiwan
Li-Min Chen, Lung-Hsing Kuo, Hung-Jen Yang

New Parallel Explicit Group Domain Decomposition Solutions of the 2-Dimensional Burger’s Equation
K. B. Tan, Norhashidah Hj. M. Ali

The Sum of Earliness and Tardiness Minimization on Unrelated Parallel Machines with Inserted Idle Time
Chi-Yang Tsai, Yi-Chen Wang

An Extended K-Means++ with Mixed Attributes
Sarunya Kanjanawattana

OpenMP Technology in the Parallelization of New Hyperbolic Group Solvers
Kew Lee Ming, Norhashidah Hj. Mohd. Ali

Design a Web-based Course by Applying Prototyping Method
Jui-Chen Yu, Hsieh-Hua Yang, Wen-Chen Hu, Lung-Hsing Kuo, Li-Min Chen, Hung-Jen Yang

Application of Information Contentto Extract Wavelet-based Feature of Rainfall-Runoff Process
Tohid Rezapour Khanghah, Vahid Nourani, Masoumeh Parhizkar, Elnaz Sharghi

Data Mining of Dengue Infection Using Decision Tree
Daranee Thitiprayoonwongse, Prapat Suriyaphol, Nuanwan Soonthornphisaj

Numerical Solutions of High Temperature on Fuel Cell Cathode
S. Srimongkol, S. Rattanamongkonkul, D. Poltem
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Design and Development of a CPU Scheduling Algorithm Simulator</td>
<td>164</td>
</tr>
<tr>
<td>Sukanya Suranauwarat</td>
<td></td>
</tr>
<tr>
<td>Improving the Effectiveness of Learning Page Replacement Algorithms using an Interactive Animated Tool</td>
<td>171</td>
</tr>
<tr>
<td>Sukanya Suranauwarat</td>
<td></td>
</tr>
<tr>
<td>The Distribution of Medical Facilities Available for Chronic Disease Patients through GIS Visualization Case Study: Central Macedonia, Northern Greece</td>
<td>177</td>
</tr>
<tr>
<td>Paul Nikolaidis, Dimitrios Xanthidis</td>
<td></td>
</tr>
<tr>
<td>Digital Consumers’ Attitudes Towards Internet Piracy, Part I: Review of the Arguments</td>
<td>184</td>
</tr>
<tr>
<td>Dimitrios Xanthidis, Eisa Aleisa</td>
<td></td>
</tr>
<tr>
<td>Digital Consumers’ Attitudes towards Internet Piracy, Part II: From the Digital Consumers’ Perspective</td>
<td>190</td>
</tr>
<tr>
<td>Dimitrios Xanthidis, Eisa Abdullah Aleisa</td>
<td></td>
</tr>
<tr>
<td>Mobile Cloud Computing: A Review on Smartphone Augmentation Approaches</td>
<td>199</td>
</tr>
<tr>
<td>Saeid Abolfazli, Zohreh Sanaei, Abdullah Gani</td>
<td></td>
</tr>
<tr>
<td>An Example of Multithreads Programming using Aspect Orientation Framework</td>
<td>205</td>
</tr>
<tr>
<td>Paniti Netinant</td>
<td></td>
</tr>
<tr>
<td>Identification of Performance Issues in Contemporary Black-Box Web Application Scanners in SQLI</td>
<td>211</td>
</tr>
<tr>
<td>Ha Thanh Le, Peter Kok Keong Loh</td>
<td></td>
</tr>
<tr>
<td>Tripod of Requirements in Horizontal Heterogeneous Mobile Cloud Computing</td>
<td>217</td>
</tr>
<tr>
<td>Zohreh Sanaei, Saeid Abolfazli, Abdullah Gani, Rashid Hafeez Khokhar</td>
<td></td>
</tr>
<tr>
<td>A Study on Interference Analysis based on Rec. ITU-R P.1546 with Geographic Information</td>
<td>223</td>
</tr>
<tr>
<td>Parallel Agent Systems on a GPU for Use with Simulations and Games</td>
<td>229</td>
</tr>
<tr>
<td>Timothy Johnson, John Rankin</td>
<td></td>
</tr>
<tr>
<td>Integrating Cloud Computing into Senior High-School Learning</td>
<td>236</td>
</tr>
<tr>
<td>Ming-Cheng Wang, Ying-Ju Chen, Lung-Hsing Kuo, Hung-Jen Yang, Hsieh-Hua Yang</td>
<td></td>
</tr>
<tr>
<td>Route Breakage Prediction Protocol for Bluetooth Network Recovery</td>
<td>242</td>
</tr>
<tr>
<td>Sabeen Tahir, Abas Md Said</td>
<td></td>
</tr>
<tr>
<td>Analysis of the Fractal Structures for the Information Encrypting Process</td>
<td>248</td>
</tr>
<tr>
<td>Ivo Motýl, Roman Jašek</td>
<td></td>
</tr>
<tr>
<td>Artificial Bee Colony (ABC) Algorithm Exploitation and Exploration Balance</td>
<td>252</td>
</tr>
<tr>
<td>Milan Tuba</td>
<td></td>
</tr>
<tr>
<td>Multilevel Image Thresholding Selection Using the Modified Seeker Optimization Algorithm</td>
<td>258</td>
</tr>
<tr>
<td>Ivona Brajevic, Milan Tuba</td>
<td></td>
</tr>
<tr>
<td>Parallelization of the Firefly Algorithm for Unconstrained Optimization Problems</td>
<td>264</td>
</tr>
<tr>
<td>Milos Subotic, Milan Tuba, Nadezda Stanarevic</td>
<td></td>
</tr>
</tbody>
</table>
Multimodal Interface for Mobile Cloud Computing
Hoon Jeong, Sungjin Kim, Hana Do, Euiin Choi, Yeojin Jeong, Yongho Kang

Computer Application Anxiety, Self-Efficacy and Open Source Learning Management System Acceptance
Norshidah Mohamed, Nor Shahriza Abdul Karim

Authors Index
Plenary Lecture 1

Active Knowledge for the Control of Product Definition

Professor Laszlo Horvath
Obuda University
(Earlier: Budapest Tech)
John von Neumann Faculty of Informatics
H-1034 Budapest, Becsi u. 96/b
Hungary
E-mail: horvath.laszlo@nik.bmf.hu

Abstract: Definition of product in the form of fully integrated product model has brought new era in product related engineering activities. Recent research and industrial development efforts concentrate on including company and product specific active knowledge in product model. This knowledge is applied to give adaptive characteristics for product modeling by capabilities of modification model entities when a former defined situation or event changes. The presentation outlines recent results in this area and details essential methods from the leading industrial practice. After a short historical introduction, it characterizes recent essential and engineer understandable knowledge representations. Relating product objects by parameter, formula, rule, check, and reaction definitions are emphasized. Following this, possibilities for integration procedures and optimization algorithm in product model are explained. In the context of the above issues, research results achieved at the Obuda University, Hungary in influence request knowledge based engineering object definition in product model are introduced. Presentation also discusses recent achievements in information exchange between virtual and physical environments. It concentrates on application of recent results in artificial intelligence and knowledge engineering in model based product definition. It considers industrially applied product modeling technology and research motivated by solving real actual industrial problems.

Brief Biography of the Speaker: Laszlo Horvath is university professor of virtual engineering systems at the Obuda University, John von Neumann Faculty of Informatics. He received the M.Sc. degree in programmable controlled manufacturing from the Budapest University of Technology and Economics in 1971. He received the Ph.D. degree from the Hungarian Academy of Sciences in 1993 and from the Budapest University of Technology and Economics in 1994 in modeling and computer aided development of industrial processes. During the past three decades, he filled several research and higher education positions in various areas of computer assisted engineering. He joined the predecessor of the Obuda University in 1992. Presently, he also serves as Vice President of Council of the Applied Informatics Doctoral School, Obuda University. His current research interests are intelligent modeling of products, human-computer interaction in engineering processes, and virtual spaces for engineers. He authored and coauthored near three hundred journal and conference papers in these areas.
Plenary Lecture 2

Computer Aided Diagnosis System for Early Detection of Breast Cancer

Professor G. R. Sinha
Faculty of Engineering and Technology
Shri Shankaracharya Group of Institutions (Integrated Campus)
INDIA
E-mail: drgrsinha@ssgi.edu.in

Abstract: Breast cancer is one of the major causes of death among women. Small clusters of micro calcifications appearing as collection of white spots on mammograms show an early warning of breast cancer. Early detection performed on X-ray mammography is the key to improve breast cancer diagnosis. In order to increase radiologist’s diagnostic performance, several computer-aided diagnosis (CAD) schemes have been developed to improve the detection of primary identification of this disease. The proposed talk will address the following approaches:
- A method will be discussed for medical image enhancement based on the well established concept of fractal derivatives and selecting image processing techniques like segmentation of an image with self similar properties. This has been tested over several images of image databases taken from BSR APPOLO centre for cancer research and diagnosis, India;
- An adaptive k-means clustering algorithm has been developed for breast image segmentation detecting micro calcifications. The algorithm works faster so that any radiologist can take a clear decision about the appearance of micro calcifications by visual inspection of digital mammograms and detection accuracy has also been improved as compared to some existing works;
- The current study investigates whether structural properties of the tissue in contiguous microcalcifications can contribute to breast cancer identification. Structural analysis of tissue in contiguous MCs shows promising results in computer-aided diagnosis of breast cancer and contributes to the reduction of unnecessary biopsies.
- Research works were carried out that remove or attenuate the curvilinear structures present in a mammogram and corresponding to the blood vessels, veins, milk ducts, speculations and fibrous tissue.

Brief Biography of the Speaker: Dr. G. R. Sinha is Professor (Electronics & Tele.) & Associate Director in Faculty of Engineering and Technology of Shri Shankaracharya Group of Institutions (Technical Campus) Bhilai, India. He obtained his B.E. (Electronics) and M.Tech. (Computer Technology) from Govt. Engineering College (Now National Institute of Technology, Raipur. He received Gold Medal for obtaining first position in the University. He received his Ph.D. in Electronics & Telecommunication from Chhattisgarh Swami Vivekanand Technical University, India. His research interest includes Digital Image Processing and it applications in biometric security, forensic science, pattern recognition, early detection of breast cancer, content retrieval of underwater imaging, neuro-fuzzy based Vehicle license plate recognition, multimodal biometrics etc. He has published 95 research papers in various international and national journals and conferences. He is active reviewer and editorial member of more than 12 international journals such as Applied Physics Research of Canada, IBSU SCIENTIFIC JOURNAL of Georgia, Scientific Journals International (SJII) of USA, Computer Science Journals of Malaysia etc. He is recipient of many awards like Engineer of the Year Award 2011, Young Engineer Award 2008, Young Scientist Award 2005, IEI Expert Engineer Award 2007, nominated for ISCA Young Scientist Award 2006 and awarded Deshbandhu Merit Scholarship for 05 years. He has been selected as Distinguished IEEE Lecturer in IEEE India council for Bombay section. Dr. G.R.Sinha is Vice President of Computer Society of India for Bhilai Chapter. He has delivered many keynote speeches and chaired many technical sessions in international conferences in SINGAPORE, Mumbai, Nagpur and across the country. He is member of signal processing society of IEEE, IACSIT and also of many national professional bodies like IETE, ISTE, CSI, ISCA, and IEI.
Plenary Lecture 3

Engineering complex information systems for monitoring health and the environment

Professor Giovanni De Micheli
EPF Lausanne
SWITZERLAND
E-mail: giovanni.demicheli@epfl.ch

Abstract: Much of the progress in engineering will stem from our ability to design complex systems out of small components and sensors. Whereas the last successful forty years of microelectronics were tied to our ability of crafting complex integrated circuits out of a myriad of transistors, future systems will exploit nanodevices to realize innovative computational fabrics whose applications require broader hardware abstractions, extended software layers and with a much higher complexity level overall. This talk will address the design of complex information systems that gather and process large amounts of data for bio-medical and environmental monitoring applications.

Brief Biography of the Speaker: Giovanni De Micheli is Professor and Director of the Institute of Electrical Engineering and of the Integrated Systems Centre at EPF Lausanne, Switzerland. He is program leader of the NanoTera.ch program. Previously, he was Professor of Electrical Engineering at Stanford University. He holds a Nuclear Engineer degree (Politecnico di Milano, 1979), a M.S. and a Ph.D. degree in Electrical Engineering and Computer Science (University of California at Berkeley, 1980 and 1983). Prof. De Micheli is a Fellow of ACM and IEEE and a member of the Academia Europaea. His research interests include several aspects of design technologies for integrated circuits and systems, such as synthesis for emerging technologies, networks on chips and 3D integration. He is also interested in heterogeneous platform design including electrical components and biosensors, as well as in data processing of biomedical information. He is author of: Synthesis and Optimization of Digital Circuits, McGraw-Hill, 1994, co-author and/or co-editor of eight other books and of over 450 technical articles. His citation h-index is 70 according to Google Scholar. He is member of the Scientific Advisory Board of IMEC and STMicroelectronics. Prof. De Micheli is the recipient of the 2003 IEEE Emanuel Piore Award for contributions to computer-aided synthesis of digital systems. He received also the Golden Jubilee Medal for outstanding contributions to the IEEE CAS Society in 2000, the D. Pederson Award for the best paper on the IEEE Transactions on CAD/ICAS in 1987, and several Best Paper Awards, including DAC (1983 and 1993), DATE (2005) and Nanoarch (2010). He has been serving IEEE in several capacities, namely: Division 1 Director (2008-9), co-founder and President Elect of the IEEE Council on EDA (2005-7), President of the IEEE CAS Society (2003), Editor in Chief of the IEEE Transactions on CAD/ICAS (1987-2001). He has been Chair of several conferences, including DATE (2010), pHealth (2006), VLSI SOC (2006), DAC (2000) and ICCD (1989). He is a founding member of the ALaRI institute at Universita' della Svizzera Italiana (USI), in Lugano, Switzerland, where he is currently scientific counselor.
Abstract: Beyond the shadow of a doubt, groundwater is the most important component of the hydrologic cycle and also an important source of water especially in the arid and semi-arid regions. Therefore, modeling and simulation of the accessible resources of groundwater in terms of both quality and quantity is a challenge for the hydrologists and multifarious models have been presented in the technical literature.

In this paper, a two-stage hybrid model is presented for time-space modeling of groundwater level and salinity concentration of a groundwater system based on Artificial Neural Network (ANN) and Geostatistics concepts. At the first stage, an integrated ANN is trained for all piezometers of the study area for time series modeling of the water level considering the spatial relationship among the piezometers. At the second stage, the predicted values of water levels at different piezometers are imposed to a calibrated Geostatistics model in order to estimate groundwater level and salinity at any desired point within the plain. In the second stage in addition to the Kriging scheme, multivariate Co-Kriging approach is also employed to find an appropriate spatial relation between the groundwater level as the primary variable and the salinity concentration of the groundwater as the secondary variable.

The proposed methodology is applied to the cost of the Urmieh Lake which is the largest lake in the middle-east and the second most hyper saline lake in the world. Due to the current drought and also mismanagement of surface water sources, the lake is drying up and creates several hydro-environmental, agricultural and economic problems for the northwest of Iran. Since the lake is the most important source of water discharge to the region’s aquifers, this problem has also a direct impact on the groundwater level and salinity.

Brief Biography of the Speaker: Vahid Nourani was born in Tabriz, Iran in 1975 and received his B.Sc. and M.S. degrees in Civil Engineering from University of Tabriz, Iran in 1998 and 2000, respectively. He then continued his graduate study in Civil and Environmental Engineering in the field of Hydrology at Shiraz University, Iran and Tohoku University, Japan and was graduated in 2005. Nourani was with the Faculty of Civil Engineering, University of Tabriz as an Assistant Professor from 2005-2009; as Associate Professor from 2009-2011 and with Dept. of Civil Eng., University of Minnesota, USA at 2011 and in this period, 35 Ph.D. and M.Sc. students were graduated under his technical supervision. His research interests include rainfall-runoff modeling, Artificial Intelligence applications to water resources engineering, Hydroinformatics and computational hydraulics. His research outcomes have been published as 34 Journal articles, 1 book, 2 book chapters and more than 45 papers presented in international and national conferences. He is currently researching about Geostatistics and 2-D wavelet transform applications to hydrological simulations.
Plenary Lecture 5

Artificial Bee Colony (ABC) Algorithm Exploitation and Exploration Balance

Professor Milan Tuba
University Megatrend Belgrade
Faculty of Computer Science
Serbia
E-mail: tuba@ieee.org

Abstract: Many heuristic algorithms were developed to find suboptimal solutions to hard optimization problems. Algorithms based on swarm intelligence represent an important branch of such metaheuristics. Artificial bee colony optimization algorithm is a recent addition to swarm intelligence algorithms that was successfully used on many different hard optimization problems, especially constrained optimization problems. All nature inspired algorithms simulate various natural phenomena. In the case of honey bees the algorithm mimics food foraging of bees with employed bees, onlooker bees and scout bees. In essence, all these diverse mimicking tries to accomplish two things: to exploit good found solutions (exploitation), but also go to unknown places (exploration) in order to avoid being trapped in local minima. The successfulness of any such nature inspired algorithm is determined by proper balance between exploitation and exploration. This balance is maintained by adjusting certain parameters and also by applying some rules in certain situations.

In general, employed bees and onlookers in the ABC algorithm perform exploitation while scout bees perform exploration. However, better results are achieved by fine tuning of the algorithm that introduces some exploration into exploitation phase and vice versa. This plenary lecture will demonstrate few successful examples of such exploitation/exploration balance adjustments for the artificial bee colony algorithm applied to constrained optimization problems.

Brief Biography of the Speaker: Milan Tuba received B. S. in Mathematics, M. S. in Mathematics, M. S. in Computer Science, M. Ph. in Computer Science, Ph. D. in Computer Science from University of Belgrade and New York University. From 1983 to 1994 he was in the U.S.A. first as a graduate student and teaching and research assistant at Vanderbilt University in Nashville and Courant Institute of Mathematical Sciences, New York University and later as an Assistant Professor of Electrical Engineering at Cooper Union Graduate School of Engineering, New York. During that time he was the founder and director of Microprocessor Lab and VLSI Lab, leader of scientific projects and supervisor of many theses. From 1994 he was Assistant professor of Computer Science and Director of Computer Center at University of Belgrade, from 2001 Associate Professor, Faculty of Mathematics, and from 2004 also a Professor of Computer Science and Dean of the College of Computer Science, Megatrend University Belgrade. He was teaching more than 20 graduate and undergraduate courses, from VLSI Design and Computer Architecture to Computer Networks, Operating Systems, Image Processing, Calculus and Queuing Theory. His research interest includes mathematical, queuing theory and heuristic optimizations applied to computer networks, image processing and combinatorial problems. He is the author of more than 130 scientific papers and a monograph. He is coeditor or member of the editorial board or scientific committee of number of scientific journals and conferences. Member of the ACM since 1983, IEEE 1984, New York Academy of Sciences 1987, AMS 1995, SIAM 2009.