

Editors: H. Fujita, J. Sasaki



# SELECTED TOPICS IN APPLIED COMPUTER SCIENCE

10<sup>th</sup> WSEAS International Conference on  
Applied Computer Science (ACS '10)

SELECTED TOPICS IN APPLIED COMPUTER SCIENCE

Sponsor and Organizer



Iwate Prefectural University, Japan, October 4-6, 2010

ISSN: 1792-4863  
ISBN: 978-960-474-231-8



# **SELECTED TOPICS in APPLIED COMPUTER SCIENCE**

**10th WSEAS International Conference on  
APPLIED COMPUTER SCIENCE (ACS '10)**

**Iwate Prefectural University, Japan  
October 4-6, 2010**

# SELECTED TOPICS in APPLIED COMPUTER SCIENCE

**10th WSEAS International Conference on APPLIED COMPUTER  
SCIENCE (ACS '10)**

**Iwate Prefectural University, Japan  
October 4-6, 2010**

Published by WSEAS Press

[www.wseas.org](http://www.wseas.org)

**Copyright © 2010, 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 two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.  
See also: <http://www.worldses.org/review/index.html>

ISSN: 1792-4863

ISBN: 978-960-474-231-8



World Scientific and Engineering Academy and Society

# **SELECTED TOPICS in APPLIED COMPUTER SCIENCE**

**10th WSEAS International Conference on  
APPLIED COMPUTER SCIENCE (ACS '10)**

**Iwate Prefectural University, Japan  
October 4-6, 2010**



**Editors:**

Hamido Fujita, Jun Sasaki

**International Program Committee Members:**

Leonid Kazovsky, USA

Charles Long, USA

Katia Sycara, USA

Roberto Revetria, USA

M. Isabel Garcia-Planas, SPAIN

Miguel Angel Gomez-Nieto, SPAIN

Akshai Aggarwal, CANADA

Pierre Borne, FRANCE

George Stavrakakis, GREECE

Angel Fernando Kuri Morales, MEXICO

Arie Maharshak, ISRAEL

Fumiaki Imado, JAPAN

Simona Lache, ROMANIA

Toly Chen, TAIWAN

Isak Taksa, USA

G. R. Dattatreya, USA

Branimir Reljin, Serbia

Paul Cristea, ROMANIA

Snejana Jordanova, BULGARIA

Ronald Yager, USA

Amauri Caballero, USA

George Vachtsevanos, USA

Robert Finkel, USA

Demetrios Kazakos, USA

Theodore Trafalis, USA

Takis Kasparis, USA

Zhiqiang Gao, USA

Yan Wu, USA

Spyros Tragoudas, USA

Arkady Kholodenko, USA

Gregory Baker, USA

Galigekere Dattatreya, USA

Caroline Sweezy, USA

Asad Salem, USA

Dian Zhou, USA

Metin Demiralp, TURKEY

Olga Martin, ROMANIA

Panos Pardalos, USA

Constantin Udriste, ROMANIA

Kleanthis Psarris, USA

Andrew D. Jones, USA

Valeri Mladenov, BULGARIA

Shyi-Ming Chen, R.O.C.

Rong-Jyue Fang, TAIWAN

Argyrios Varonides, USA

Nikolai Kobasko, USA



**Preface**

This year the 10th WSEAS International Conference on APPLIED COMPUTER SCIENCE (ACS '10) was held at the Iwate Prefectural University, Japan, October 4-6, 2010. The conference remains faithful to its original idea of providing a platform to discuss programming languages, software engineering, project management, intelligent agents, data mining, web engineering, network applications, algorithms etc. with participants from all over the world, both from academia and from industry.

Its 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 this conference are published in this Book that will be indexed by ISI. Please, check it: [www.worldses.org/indexes](http://www.worldses.org/indexes) as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this 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

<b>Plenary Lecture 1: Face Recognition Using Frequency Domain Feature Extraction Methods</b> <i>Hector Perez-Meana</i>	15
<b>Plenary Lecture 2: Computations in Hyperbolic Spaces with Surprising Applications</b> <i>Maurice Margenstern</i>	16
<b>Plenary Lecture 3: Pervasive Business Intelligence Architecture</b> <i>Zeljko Panian</i>	17
<b>Plenary Lecture 4: Black Holes Nonholonomic Thermodynamics</b> <i>Constantin Udriste</i>	18
<b>Plenary Lecture 5: Multiple Latticed Cellular Automata: HIV Dynamics in Coupled Lymph Node and Peripheral Blood Compartments</b> <i>Yongwimon Lenbury</i>	19
<b>Plenary Lecture 6: Facial Expression Recognition for Speaker Using Thermal Image Processing and Speech Recognition System</b> <i>Yasunari Yoshitomi</i>	20
<b>Plenary Lecture 7: Genetic Search Algorithms to Fuzzy Multiobjective Games: a Mathematica Implementation</b> <i>Andre A. Keller</i>	21
<b>Plenary Lecture 8: Magic Wand Approach to Representation of Personal Technologies</b> <i>Victor Malyshkin</i>	22
<b>Plenary Lecture 9: Formal and Automatic Enforcement of Security by Rewriting</b> <i>Mohamed Mejri</i>	23
<b>Plenary Lecture 10: PLAYWARE: Intelligent Hardware and Software that Creates Playful Experiences</b> <i>Henrik Hautop Lund</i>	24
<b>Facilitating Tacit-Knowledge Acquisition within Requirements Engineering</b> <i>Abdulmajid Hissen Mohamed</i>	27
<b>Guidelines for Effort and Cost Allocation in Medium to Large Software Development Projects</b> <i>Kassem Saleh</i>	33
<b>Genetic Algorithms for Multi-Objectives Problems under its Objective Boundary</b> <i>Anon Sukstrienwong</i>	38
<b>Speech Recognition Approach : Desktop Items Activation with Comparative Analysis</b> <i>Sandhya Tarar, Ajeet Pratap Singh, Shekhar Singh</i>	44

<b>Functional Learning &amp; Introduction to the Electronic Brain on El-Dorra Neural Network Technology</b> <i>Abdallah Omari</i>	49
<b>Multiple Latticed Cellular Automata: HIV Dynamics in Coupled Lymph Node and Peripheral Blood Compartments</b> <i>S. Moonchai, Y. Lenbury, W. Triampo</i>	56
<b>Data Mining and Data Gathering in a Refinery</b> <i>Mahmoud Reza Saybani, Teh Ying Wah</i>	62
<b>A Novel Alignment-Free Method for Phylogenetic Analysis of Protein Sequences</b> <i>Shengli Zhang, Tianming Wang</i>	67
<b>Traffic-Sensitive S-TDMA Schedule Based on Traffic Load Estimate for Maintenance Self-Organized Radio Wireless Network</b> <i>Seyed Hossein Kamali, Maysam Hedayati, Mohsen Rahmani</i>	72
<b>Modeling with Finite Element the Convective Heat Transfer in Civil Building EPS Insulated Walls</b> <i>Madalina Xenia Calbureanu, Mihai Lungu, Dragos Tutunea, Raluca Malciu, Alexandru Dima</i>	79
<b>Face Recognition and Verification using Histogram Equalization</b> <i>Kelsey Ramirez-Gutierrez, Daniel Cruz-Perez, Hector Perez-Meana</i>	85
<b>Improvement of Directive Gain for a Wire Dipole with Novel Resonant EBG Reflector</b> <i>C. Yotnuan, P. Krachodnok, R. Wongsan</i>	90
<b>A Study of Network Security Systems</b> <i>Ramy K. Khalil, Fayez W. Zaki, Mohamed M. Ashour, Mohamed A. Mohamed</i>	96
<b>OTS and Central Expanding Blocks Scan for Interframe Compression</b> <i>Aree Ali Mohammed</i>	106
<b>An Empirical Study of Distributed Database on PC Cluster Computers</b> <i>Sorapak Pukdesree, Vitalwonhyo Lacharaj, Parinya Sirisang</i>	111
<b>Proposal for Training Embedded Software Engineers Using a Real-time Kernel Implementation Practice Program</b> <i>Toshio Yoshida, Jun Sawamoto</i>	116
<b>A Problem of Maternal and Fetal QRS Complexes in Fetal Heart Rate</b> <i>Janusz Jezewski, Tomasz Kupka, Krzysztof Horoba, Robert Czabanski, Janusz Wrobel</i>	122
<b>Reducing Influence of Doppler Ultrasound Signal Processing Techniques on Fetal Heart Rate Variability</b> <i>Janusz Wrobel, Janusz Jezewski, Dawid Roj, Tomasz Przybyla, Adam Matonia</i>	128
<b>Fault Tolerance and Security Issues in MPLS Networks</b> <i>Sahel Alouneh, Sa'ed Abed</i>	134
<b>Sequence Mining in DNA Chips Data for Diagnosing Cancer Patients</b> <i>Zakaria Suliman Zubi, Marim Aboajela Emsaed</i>	139

<b>Stability and Periodicity in a Model of Bone Remodeling under Impulsive PTH Control</b> <i>M. Chudtong, Y. Lenbury, C. Ratanakul</i>	152
<b>Communication Method for Remote Device Control using the Internet and its Evaluation</b> <i>Shinji Kitagami, Yosuke Kaneko, Akihisa Yasuda, Harumi Minemura, Jun Sawamoto</i>	158
<b>Image Authentication Based on DCT with Recovery Capability</b> <i>Jose Antonio Mendoza Noriega, Brian M. Kurkoski, Mariko Nakano Miyatake, Hector Perez Meana</i>	164
<b>Multipurpose Color Image Watermarking Algorithm Based on IWT and Halftoning</b> <i>C. Santiago-Avila, M. Gonzalez Lee, M. Nakano-Miyatake, H. Perez-Meana</i>	170
<b>A Proposed Model for Measuring the Aggregative Risk Degree of Implementing E-Learning ERP System</b> <i>Tsung-Han Chang, Shu-Chen Hsu</i>	176
<b>Facial Expression Recognition for Speaker Using Thermal Image Processing and Speech Recognition System</b> <i>Yasunari Yoshitomi</i>	182
<b>Multiple Latticed Cellular Automata: HIV Dynamics in Coupled Lymph Node and Peripheral Blood Compartments</b> <i>S. Moonchai, Y. Lenbury, W. Triampo</i>	187
<b>The Use of Hide in Learning the Value of a Function</b> <i>K. Khompurngson, D. Poltem, A. Yamarat, B. Novaprateep</i>	193
<b>The Assessment of the Incomplete Linguistic Preference Relations on the Choosing Multimedia Teaching Tools</b> <i>Shu-Chen Peng, Chao-Yen Wu</i>	198
<b>Digital Archiving of Archaeological Remains Using X-Ray CT</b> <i>Akio Doi, Kenji Ono</i>	204
<b>Ontology-Based Document Profile for Vulnerability Relevancy Analysis</b> <i>Ratsameetip Wita, Nattanatch Jiamnapanon, Yunyong Teng-Amnuay</i>	210
<b>Stability of a General Iterative Algorithm</b> <i>Bhagwati Prasad, Ritu Sahni</i>	216
<b>Quarantine Technology using Botnets Information</b> <i>Seung-Goo Ji, Hyun-Cheol Jeong</i>	222
<b>Physically Based Evaluation of Reflected Terrain Irradiance in Satellite Imagery for Illumination Correction</b> <i>Masahiko Sugawara, Sumio Tanba, Yoshikazu Iikura</i>	226
<b>Software Package for Improving the Milling Process of 3D Parts</b> <i>Camil Lancea, Gheorghe Oancea, Lucia-Antoneta Chicos, Valentin Stamate</i>	234
<b>Software System of Integrated and Simultaneous Engineering</b> <i>Lucia-Antoneta Chicos, Gheorghe Oancea, Camil Lancea, Daniel Bancila</i>	238
<b>Browsing and Editing Tool for Programming in Pictures</b> <i>Yutaka Watanobe, Nikolay Mirenkov, Rentaro Yoshioka</i>	242

<b>Two-Way Mobile Authenticator</b> <i>Petr Kopecek</i>	251
<b>Knowledge Portal on Computational Linguistics: Content-Based Multilingual Access to Linguistic Information Resources</b> <i>Yury Zagorulko, Olesya Borovikova, Galina Zagorulko</i>	255
<b>The Practice of Applicability Checks in Information Systems Research : An Empirical Confirmation</b> <i>Magda Huisman, Pieter Conradie</i>	263
<b>A Support System for Generating Sign Language Animation Using Thermal Image Processing</b> <i>Taro Asada, Yasunari Yoshitom</i>	269
<b>Mobile Robot Navigation using SURF Features</b> <i>Masayoshi Tabuse, Dai Nakai</i>	276
<b>Statistical Approach to Analysis of the Regions</b> <i>Pavel Petr, Jiri Krupka, Romana Provaznikova</i>	280
<b>Using Duo Output Neural Network to Solve Binary Classification Problems</b> <i>Pawalai Kraipeerapun, Somkid Amornsamankul</i>	286
<b>Anomaly Detection using Self-Organizing Map and Wavelets in Wireless Sensor Networks</b> <i>Supakit Siripanadorn, Wipawee Hattagam, Neung Teaumroong</i>	291
<b>E-Commerce - Winners' Choice</b> <i>Costel Nistor, Rozalia Nistor, Mihaela-Carmen Muntean</i>	298
<b>Three-Dimensional Simulation of the Femur Bone Using Finite Element Method</b> <i>Somkid Amornsamankul, Benchawan Wiwatanapataphee, Kamonchat Kaorapapong</i>	304
<b>Extended Design of a Computer Input Device Using Screen-Partitioning and Auxiliary-Window-Screen design for People with Disabilities</b> <i>Ching-Tien Shih, Ching-Hsiang Shih, Ching-Hsing Luo</i>	308
<b>A Tool for Detecting Detects on Class Implementation in Object Oriented Program on the Basis of the Law of Demeter: Focusing on Dependency between Packages</b> <i>Ryota Chiba, Hiroaki Hashiura, Seiichi Komiya</i>	315
<b>A Comparative Study of Structured Differential Evolutions</b> <i>Takashi Ishimizu, Kiyoharu Tagawa</i>	321
<b>Open Set of Algorithmic Characters</b> <i>Rentaro Yoshioka, Yutaka Watanobe, Nikolay Mirenkov</i>	327
<b>Application of Half-Circle Fuzzy Numbers and Development of Triangular Fuzzy Numbers to Fuzzy Control</b> <i>Wan-I Lee, Cheng-Wu Chen, Chen-Yuan Chen, Yi-Chaio Sui</i>	335
<b>Detection of Baby Voice and its Application Using Speech Recognition System and Fundamental Frequency Analysis</b> <i>Shota Yamamoto, Yasunari Yoshitomi, Masayoshi Tabuse, Kou Kushida, Taro Asada</i>	341

<b>An Extraction of Emotion in Human Speech Using Cluster Analysis and a Regression Tree</b>	346
<i>Masaki Kurematsu, Saori Amanuma, Jun Hakura, Hamido Fujita</i>	
<b>Genetic Search Algorithms to Fuzzy Multiobjective Games: A Mathematica Implementation</b>	351
<i>Andre A. Keller</i>	
<b>A Meta-Logical Approach for Reasoning with Ontologies and Rules Expressed in OWL 2</b>	360
<i>Visit Hirankitti, Trang Mai Xuan</i>	
<b>Detecting Precursory Events in Time Series Data by an Extension of Singular Spectrum Transformation</b>	366
<i>Terumasa Tokunaga, Daisuke Ikeda, Kazuyuki Nakamura, Tomoyuki Higuchi, Akimasa Yoshikawa, Teiji Uozumi, Akiko Fujimoto, Akira Morioka, Kiyofumi Yumoto</i>	
<b>Simulation of a Stochastic Cellular Automata HIV/AIDS Model for Investigation of Spatial Pattern Formation Mediated by CD4+ T Cells and HIV Dynamics</b>	375
<i>Monamorn Precharattana, Wannapong Triampo, Charin Modchang, Darapond Triampo, Yongwimon Lenbury</i>	
<b>Anomaly Detection in Wireless Sensor Networks using Self-Organizing Map and Wavelets</b>	381
<i>Supakit Siripanadorn, Wipawee Hattagam, Neung Teaumroong</i>	
<b>Approach to Synthesis of Health and Environmental Model</b>	388
<i>Jiri Krupka, Miloslava Kasparova, Jan Mandys, Pavel Jirava</i>	
<b>Solving the Euclidean K-Median Problem by DCA</b>	394
<i>Le Thi Hoai An, Pham Dinh Tao</i>	
<b>On Molecular Implementations of Cellular Automata</b>	401
<i>Ferdinand Peper, Anirban Bandyopadhyay, Hiroshi Oono, Satyajit Sahu, Ranjit Pati, Subrata Ghosh, Tejiro Isokawa, Daisuke Fujita</i>	
<b>Scheduling Jobs and Preventive Maintenance Activities on Parallel Machines</b>	406
<i>Maher Rebai, Imed Kacem, Kondo H. Adjallah</i>	
<b>FloodKey: Increasing Software Keyboard Keys by Reducing Needless Ones without Occultation</b>	412
<i>Geoffroy Aulagner, Romain Francois, Benoit Martin, Dominique Michel, Mathieu Raynal</i>	
<b>On-line Debugging Methods and Tools in Movie-Based Programming</b>	418
<i>Dmitry Vazhenin, Alexander Vazhenin</i>	
<b>A Website Structure Optimization Model</b>	426
<i>Nicoleta David, Liviu Stelian Begu</i>	
<b>Learning Spontaneous Nonverbal Behavior using a Three Layers Hierarchy</b>	430
<i>Yasser F. O. Mohammad, Toyoaki Nishida</i>	
<b>Web Services – Opportunities and Challenges</b>	436
<i>Nicoleta David, Claudia-Georgeta Carstea, Ioan-Gheorghe Ratiu, Lucian Patrascu, Daniela Damian</i>	
<b>Unearthing Clues to Reduce the Devastating Effects of Earthquakes: The Hilbert-Huang Transform</b>	440
<i>Silvia Garcia, Miguel Romo</i>	

<b>Study on Economical Structure of Safety Monitoring System by using Telephone for Elderly People Living Alone in a Rural Area</b>	447
<i>Jun Sasaki, Keizo Yamada, Masanori Takagi, Michiru Tanaka, Akiko Ogawa</i>	
<b>Investigating Collaborative Interaction using Interactive Table and IR Devices</b>	455
<i>T. Puckdeepun, J. Jaafar, M. F. Hassan</i>	
<b>An Approach of Visualizing Objects Overlapping for Assisting User Cognition</b>	461
<i>Kohei Sugawara, Hamido Fujita</i>	
<b>Differential Navigation for UAV Platforms with Mobile Reference Station</b>	465
<i>Nawrat Aleksander, Kozak Kamil, Daniec Krzysztof, Koteras Roman</i>	
<b>Parallelization of K-Means Clustering on Multi-Core Processors</b>	472
<i>Kittisak Kerdprasop, Nittaya Kerdprasop</i>	
<b>Fast Karnough Map for Simplification of Complex Boolean Functions</b>	478
<i>Hazem M. El-Bakry</i>	
<b>A High Recall DNA Splice Site Prediction Based on Association Analysis</b>	484
<i>Nittaya Kerdprasop, Kittisak Kerdprasop</i>	
<b>Influence of Oracle Hints on Query Execution</b>	490
<i>Jan Panus, Josef Pirkl</i>	
<b>On the Margin Effects of Commercial Bank Expansion into Securities and Insurance Activities under the Same Roof: A Mathematical Swap Approach</b>	496
<i>Jyh-Jiuan Lin, Pai-Chou Huang, Wei-Ming Hung</i>	
<b>Modeling Bank Interest Margin and Loan Quality under the Troubled Asset Relief Program: An Option-Pricing Approach</b>	502
<i>Jyh-Horng Lin, Jyh-Jiuan Lin, Pai-Chou Huang</i>	
<b>Parallel Computing for Modified Local Search</b>	508
<i>Jan Panus</i>	
<b>Playware Soccer – Flexibility through Modularity and Layered Multi-Modal Feedback</b>	514
<i>Henrik Hautop Lund</i>	
<b>Modular Interactive Tiles for Rehabilitation – Evidence and Effect</b>	520
<i>Henrik Hautop Lund</i>	
<b>Contextualised ICT4D: A Bottom-Up Approach</b>	526
<i>Henrik Hautop Lund, Erkki Sutinen</i>	
<b>Authors Index</b>	531

## Plenary Lecture 1

### Face Recognition Using Frequency Domain Feature Extraction Methods



#### Professor Hector Perez-Meana

The National Polytechnic Institute of Mexico  
MEXICO

E-mail: [hmpm@prodigy.net.mx](mailto:hmpm@prodigy.net.mx)

**Abstract:** The development of security systems based on biometric features has been a topic of active research during the last three decades, because the recognition of the people identity to access control is a fundamental issue in these days. Terrorist attacks happened during the last decade have demonstrated that it is indispensable to have reliable security systems in offices, banks, airports, etc.; increasing in such way the necessity to develop more reliable methods for people recognition. The biometrics systems consist of a group of automated methods for recognition or verification of people identity using the physical characteristics or personal behavior of the person under analysis. In particular the face recognition has been a topic of active research because the face is the most direct way to recognize the people. In addition, the data acquisition of this method consists, simply, of taking a picture with or without collaboration of the person under analysis, doing it one of the biometric methods with larger acceptance among the users.

The face recognition is a very complex activity of the human brain. For example, we can recognize hundred of faces learned throughout our life and to identify familiar faces at the first sight, even after several years of separation, with relative easy. However it is not a simple task for a computer. Thus to develop high performance face recognition systems, we must to develop accurate feature extraction and classification methods, because, as happens with any pattern recognition algorithm, the performance of a face recognition algorithm strongly depends on the feature extraction method and the classification systems used to carry out the face recognition task. Thus during the last decades several feature extraction methods for using in face recognition systems have been proposed during the last decades, which achieve high accurate recognition. Among the situations that drastically decrease the accuracy and that must be considered to develop high performance face recognition method we have: partial occlusion, illumination variations, size change, rotation and translation of the capture image, etc. To solve these problems several efficient feature extraction methods have been proposed, several of them using frequency domain transforms such as discrete Gabor transform, discrete Fourier transform, Discrete cosine transform, etc. These methods achieve recognition rates higher than 90%.

In this talk, we analyze several frequency domain feature extraction methods based on the Discrete Gabor transform, Discrete Fourier Transform, Discrete Wavelet Transform, Discrete Cosine Transform, Discrete Walsh-Hadamard Transform and Eigenphases. These feature extraction methods are used with different classifiers such as artificial neural networks (ANN), Gaussian Mixture Models (GMM) and Support vector machines (SVM). The evaluation results were obtained using well known public domain databases such as "AR Face Database".

#### Brief Biography of the Speaker:

Hector Perez-Meana received his M.S: Degree on Electrical Engineering from the Electro-Communications University of Tokyo Japan in 1986 and his Ph. D. degree in Electrical Engineering from the Tokyo Institute of Technology, Tokyo, Japan, in 1989. From March 1989 to September 1991, he was a visiting researcher at Fujitsu Laboratories Ltd, Kawasaki, Japan. From September 1991 to February 1997 he was with the Electrical Engineering Department of the Metropolitan University of Mexico City where he was a Professor. In February 1997, he joined the Graduate Studies and Research Section of The Mechanical and Electrical Engineering School, Culhuacan Campus, of the National Polytechnic Institute of Mexico, where he is now The Dean. In 1991 he received the IEICE excellent Paper Award, and in 2000 the IPN Research Award and the IPN Research Diploma. In 1998 he was Co-Chair of the ISITA'98, and in 2009 he was the General Chair of The IEEE Midwest Symposium on Circuit and Systems (MWSCAS). Prof. Perez-Meana has published more than 100 papers and two books. He also has directed 15 PhD theses and more than 30 Master theses. He is a Senior member of the IEEE, member of The IEICE, The Mexican Researcher System and The Mexican Academy of Science. Prof. Perez-Meana is member of the Editorial Board of The Journal of Telecommunications and Radio Engineering, he is also member of The Editorial Board of The Journal of Electromagnetic Waves and Radio Engineering. His principal research interests are adaptive systems, image processing, pattern recognition watermarking and related fields.



## Plenary Lecture 2

### Computations in Hyperbolic Spaces with Surprising Applications



#### Professor Maurice Margenstern

University Paul Verlaine, Metz  
 UFR MIM, LITA, EA 3097  
 Ile du Saulcy  
 57045 METZ Ce'dex  
 FRANCE

E-mail: [margens@univ-metz.fr](mailto:margens@univ-metz.fr)

**Abstract:** Computations in hyperbolic spaces are difficult due to the group properties of these spaces which make it difficult to use these tools, in sharp contrast with the Euclidean situation.

The author devised a way to navigate in the tessellations of the hyperbolic plane and one of the four tessellations of the hyperbolic 3D space. This constitutes an actual GPS which allows to know the position of each tile with respect to the others and to go from one tile to another one. From this, true coordinates for the points of these spaces themselves can be devised which have a nice behaviour under shifts which preserve the tessellation.

In the talk, we sketchily remind the Poincaré's disc model which we use in order to try to see something in these spaces. Then, we describe the coordinate system. In the main part of the talk, we present and discuss the wide range of its applications: this goes from cosmology to computer science itself, including the Internet. We shall look at already realized applications and at those waiting for realization as well.

#### Brief Biography of the Speaker:

MARGENSTERN Maurice, born on June, 6, 1947, Paris, France, married, 2 children, 1 grand-child, is full professor at the University of Metz, IUT of Metz, France, from 1995. Formerly, he was associated professor at the department of mathematics of the University Paris-Sud. He was the head of LITA (Laboratoire d'Informatique Théorique et Appliquée), from 2000 up to 2008 and an elected member of the scientific council of his university from 2000 up to 2004. He was also the head of the hiring committee of his university for computer science from 1998 up to 2004. Recently, he was promoted to the exceptional class for university professors by the National Council of Universities in France.

His scientific activity deals with the frontier between decidability and undecidability which is studied in various models of discrete computations. He has important results in Turing machines, in cellular automata and in (bio)molecular computing. He wrote 183 papers, among them 55 in well known international journals, 48 in international conferences with proceedings. He is a member of the Editorial Board of the Journal of Universal Computer Science, of the Journal of Cellular Automata and he is a member of the Advisory Board of the Computer Science Journal of Moldova. He is a member of WG 1.5 in the TC1 of IFIP.

He is very active in the field of cellular automata. He introduced an original method in order to implement these automata in hyperbolic spaces. This has very interesting connections with elementary theory of numbers and the theory of languages. It may also have surprising applications. He published many papers on this topic and a two-volumed book, "Cellular Automata in Hyperbolic Spaces", an important scientific event. He is also a contributor to Springer Encyclopedia of Complexity and Systems Science.

Maurice Margenstern edited several special issues in international journals of Computer Science: in Theoretical Computer Science, in Fundamenta Informaticae and a new issue is currently planned for the International Journal of Foundations of Computer Science.

Maurice Margenstern organised a cycle of conferences, called "Machines, Computations and Universality", MCU-conferences, which hold each third year starting from 1995. Each edition of the conference is followed by a special issue of a well know journal: TCS for the first three editions, FI for the fourth and fifth editions (Saint-Petersburg, 2004 and Orleans, 2007). The sixth edition is to be held at Pittsburgh, USA, in September, 21-25, 2010. The proceedings will be published in EPTCS and a special issue of IJFCS will follow the conference, devoted to its topics.

## Plenary Lecture 3

### Pervasive Business Intelligence Architecture



#### Professor Zeljko Panian

The Faculty of Economics and Business  
University of Zagreb  
Croatia

E-mail: [zpanian@efzg.hr](mailto:zpanian@efzg.hr)

**Abstract:** Pervasive business intelligence (BI) is the ability to deliver integrated right-time information to all users – including managers at all levels, front-line and back-office employees, suppliers, customers, and business partners. It provides an enterprise with the necessary visibility, insight, and facts to make smarter decisions in all processes at all times. In most companies, this means leveraging the existing BI infrastructure by providing decision services to multiple managerial and operational business processes.

The pervasive BI architecture illustrates both transactional services (i.e., Online Transaction Processing, OLTP) and decision-making services as peers in the existing infrastructure. Enterprise users may access the IT infrastructure via internal and external Web portals, enterprise and Web applications, POS terminals, self-service kiosks, hand-held devices, and interactive voice response servers.

Transaction services are applications that provide the enterprise bookkeeping function. This is where we find traditional call center automation (operational customer relationship management, CRM), enterprise resource planning (ERP), supply chain management (SCM), and legacy applications.

Data integration services bridge multiple domains, providing both continuous streams of information, as well as batch file data acquisition. Acquiring changed data from the transactional repositories; the data integration services extract, discover, cleanse, transform, and deliver data to multiple subscribers.

Decision repositories are the enterprise data warehouses, data marts, and operational data stores. They ingest and persist the results of data integration services and provide high-speed access to a wide variety of data content.

Decision services are used to analyze facts, patterns, and relationships in enterprise data repositories and deliver relevant information. This part of the architecture focuses on BI and applications accessing the data warehouse. This includes reporting, data mining, dashboarding, tactical applications, operational applications, and strategic applications, such as market segmentation, risk analysis, category management, profitability analysis, user satisfaction analysis, financial planning, and business performance management.

Enterprise application integration is largely achieved using an Enterprise Service Bus (ESB), messaging middleware, J2EE and .NET developer tools, and service-oriented architecture (SOA). Included here are numerous middleware services, such as adapters, transforms, agents, publish and subscribe, and information routing.

Business process automation is a collection of capabilities to oversee and orchestrate processes. This includes Business Process Management (BPM), Business Activity Monitoring (BAM), and Business Rules Engines (BRE). These systems manage SOA workflow, detect events, send alerts and alarms, and allow business users to dynamically change business rules in real time.

#### Brief Biography of the Speaker:

Zeljko Panian is full professor of business informatics at The Faculty of Economics and Business, University of Zagreb, Croatia. He received his master degree in 1978 and Ph. D. in 1981 at the University of Zagreb. His scientific interests are primarily focused on Enterprise Information Systems, e-Business and Business Intelligence.

He wrote 32 books and more than 150 scientific and professional papers, and lectured as a visiting professor at the People's University of China at Beijing, Florida State University in Tallahassee (USA), University of Maribor (Slovenia) and University of Sarajevo and Mostar (Bosnia and Herzegovina), as well as nearly all universities in Croatia.

For several times, he delivered invited, keynote and plenary speeches at WSEAS and other international conferences and symposiums.

## Plenary Lecture 4

### Black Holes Nonholonomic Thermodynamics



**Professor Constantin Udriste**  
 Department of Mathematics  
 University Politehnica of Bucharest  
 Romania  
 E-mail: [anet.udri@yahoo.com](mailto:anet.udri@yahoo.com)

**Abstract:** This Lecture presents the geometry and the interaction of nonholonomic black hole systems using a specialized MAPLE soft for computing. Our point of view is strongly connected to the possibility of describing a nonholonomic black hole system via a Gibbs-Pfaff equation, or to the possibility of having extremum problems with nonholonomic constraints.

Section 1 introduces a nonholonomic black hole system and proves that the existence of an integral surface of the Gibbs-Pfaff equation implies the second area condition (the equality of two elements of area). Section 2 shows that the equilibrium after interaction of two nonholonomic black hole systems is realized at equal temperatures and equal angular velocities. Section 3 uses the nonholonomic theory of Vranceanu to build the subriemannian geometry of black holes. Section 4 computes the coefficients of the bilinear covariants of the Gibbs-Vranceanu co-framed nonholonomic space. The geometry of the Gibbs-Vranceanu-Riemann nonholonomic space is represented by the Ricci rotation coefficients (Section 5), the geodesics (Section 6), the Ricci coefficients with four indexes (Section 7), the Ricci tensor and the scalar curvature (Section 8). We introduce also some interesting submanifolds: the submanifold of the coefficients of bilinear covariants (Section 9), the submanifold of Ricci rotation coefficients (Section 10), the submanifold of Ricci coefficients with four indexes (Section 11). Section 12 underlines that some properties of black holes can be obtained using geometric tools in MAPLE version.

#### Brief Biography of the Speaker:

Important Career Positions: Dean, Director, Chair, Full Professor 1990-, University Politehnica of Bucharest, Department of Mathematics-Informatics I.

Number of PhD Students: 25 in due time and 14 Doctors in Mathematics.

Membership of Associations: AMS, 1987; Tensor Society, 1985; Balkan Society of Geometers, President, 1994;

Publications: over 40 books; 230 papers; 230 communications.

Honours: D. Hurmuzescu Prize, Romanian Academy, 1985; Award MEI, 1988; Correspondent Member, Academia Peloritana, Messina, 1997; Titular Member, Academy of Romanian Scientists, 2007; Honorary Member, World Scientific and Engineering Academy and Society, 2008-;

Main Organizer: The International Conference of Differential Geometry and Dynamical Systems, University Politehnica of Bucharest, October 5-7, 2007; The International Conference of Differential Geometry and Dynamical Systems, The V-th International Colloquium of Mathematics in Engineering and Numerical Physics, August 29-September 02, 2008; The International Conference of Differential Geometry and Dynamical Systems, University Politehnica of Bucharest, October 7-11, 2009.

Chair Committee or Member of the International Advisory Committee: 7th WSEAS International Conference on Systems Theory and Scientific Computation (ISTASC-07), Vouliagmeni Beach, Athens, Greece, August 24-26 (2007); European Computing Conference, Vouliagmeni Beach, Athens, Greece, September 24-26, 2007; 12th WSEAS International Conference on Applied Mathematics, Cairo, Egypt, Dec. 29-31, 2007; 7th WSEAS International Conference on Circuits, Systems, Electronics, Control and Signal Processing, Cairo, Egypt, Dec. 29-31, 2007; Chair-Committee: American Conference on Applied Mathematics (Math-08) and Management, Marketing and Finances (MMF-08), Cambridge, Massachusetts, USA, March 24-26, 2008; International Program Committee: The Applied Computing Conference (ACC-08), Istanbul, Turkey, May 27-30, 2008; European Computing Conference (ECC-09), Tbilisi, Georgia, June 26-28, 2009; The 9th WSEAS International Conference on Applied Informatics and Communications (AIC-09), Moscow, Russia, August 20-22, 2009; The 10th International Conference on Applied Computer Science (ACS-10), Iwate, Japan, October 4-6, 2010.

Fields of Interest: Differential Geometry, Optimizations on Riemannian Manifolds, Magnetic Dynamical Systems, Geometric Dynamics, Multitime Optimal Control.

## Plenary Lecture 5

### Multiple Latticed Cellular Automata: HIV Dynamics in Coupled Lymph Node and Peripheral Blood Compartments



#### Professor Yongwimon Lenbury

Co-authors: S. Moonchai, Y. Lenbury, W. Triampo

Dept of Mathematics, Faculty of Science, Mahidol University, THAILAND

Centre of Excellence in Mathematics, PERDO, CHE, THAILAND

Mahidol University, THAILAND

E-mail: [scylb@mahidol.ac.th](mailto:scylb@mahidol.ac.th)

**Abstract:** Cellular automata simulation approach has become well known as a useful technique to investigate complex biomedical systems in situations where traditional methodologies are difficult or too costly to employ. In certain applications, multiple lattices are needed to simulate parallel multi-compartmental systems. So far, relatively simple cellular automata models have been proposed to simulate the dynamics of HIV infection in human. Most cellular automata models only considered viral proliferation in the lymph node. However, most clinical indications of AIDS progression are based on blood data, because these data are most easily obtained. Since viral population circulates between lymph node and plasma, viral load in the two compartments are important for the description of HIV infection dynamics. We present here cellular automata simulations of a two-compartment model of HIV proliferation with delay.

## Plenary Lecture 6

### Facial Expression Recognition for Speaker Using Thermal Image Processing and Speech Recognition System



#### Professor Yasunari Yoshitomi

Information Communication System Lab.  
Graduate School of Life and Environmental Sciences  
Kyoto Prefectural University  
JAPAN  
E-mail: [yoshitomi@kpu.ac.jp](mailto:yoshitomi@kpu.ac.jp)

**Abstract:** The goal of our research is to develop a robot which can perceive human feelings or mental states. The robot should be able to interact in a friendly manner with a human. For example, it could perhaps encourage a human who looks sad. Moreover, it could advise a person to stop working and rest for a while when the individual looks tired. Moreover, it could take care of a person advanced in years.

The presented investigation concerns the first stage of development wherein a robot acquires vision with the ability to detect human feeling or inner mental states. Although the mechanism for recognizing facial expressions as one of the main, visible expressions of feeling has been received considerable attention in the course of computer vision research, its present stage still falls far short of human capability, especially from the viewpoint of robustness under widely ranging lighting conditions. One of the reasons is that nuances of shade, reflection, and local darkness influence the accuracy of facial expression recognition through the inevitable change of gray levels. In order to avoid the problem and to develop a robust method for facial expression recognition applicable under widely varied lighting condition, we have used an image registered by infrared rays (IR) which describes the thermal distribution of the face. Although a human can not detect IR, it is possible for a robot to process the information around it using thermal images created by IR. Therefore, as a new mode of robot-vision, thermal image processing is a practical method viable under natural conditions.

The timing of recognizing facial expressions is also important for a robot because the processing for doing it might be time-consuming. We have adopted an utterance as the key of expressing human feelings or mental states because humans tend to say something to express feelings.

In this talk, I lecture on our method for facial expression recognition for a speaker by exploiting a new technique for deciding the timing positions of extracting the frames from the thermal dynamic image at an utterance, using a speech recognition system. For facial expression recognition, we pick up three images (i) just before speaking, in speaking (ii) the first and (iii) last vowels at an utterance. The face direction is also estimated for selecting front-view faces as targets of facial expression recognition using thermal image processing. A two-dimensional discrete cosine transformation is performed for transforming gray-scale values on each block in focused face-parts of image into their frequency-components, which are used for generating feature vectors. In this method, the facial expressions are discriminable with the good recognition accuracy, when he or she exhibits one of the intentional facial expressions of "angry", "happy", "neutral", "sad", and "surprise".

#### Brief Biography of the Speaker:

Yasunari Yoshitomi received his B.E., M.E. and Dr. Eng. degrees in Applied Mathematics and Physics from Kyoto University in 1980, 1982, and 1991, respectively. He had worked in Nippon Steel Corporation from 1982 to 1995 and had been engaged in image analysis application and development of soft magnetic materials. From 1995 to 2001, he had been in Miyazaki University as an associate professor at the Department of Computer Science and Systems Engineering. From 2001 to 2008, he had been in Kyoto Prefectural University as a professor at the Department of Environmental Informatics. Since 2008, he has been in Kyoto Prefectural University as a professor at the Environmental Information System Subdivision, Division of Environmental Sciences, Graduate School of Life and Environmental Sciences. He is a member of IEEE, IPSJ, IEICE, JSIAM, ORSJ, HIS, SSJ and IIEEJ. He received a Best Paper Award from IEEE International Workshop on Robot and Human Communication in 1998, and a Best Paper Award from IEEE International Workshop on Robot and Human Interactive Communication in 2000. He has published more than 100 papers, two reviews, two books, and more than 200 patents. He has been listed in the 2010 Edition of Marquis Who's Who in the World. His current research interests are communication between human and computer, media information processing, watermarking and biometric authentication on digital content, stochastic programming problem and simulation on emission trading of greenhouse effect gas.

## Plenary Lecture 7

### Genetic Search Algorithms to Fuzzy Multiobjective Games: A Mathematica Implementation



#### Professor Andre A. Keller

Universite de Lille 1 Sciences et Technologies  
Cite Scientifique 59655 Villeneuve d'Ascq Cedex FRANCE  
E-mail: [andre.keller@univ-lille.fr](mailto:andre.keller@univ-lille.fr)

**Abstract:** Genetic stochastic search algorithms (GAs) have soon demonstrated their helpful contribution in finding solutions to the complex real-life optimization problems. In 2005, Mastorakis' method successfully combines the GAs with the Nelder-Mead (NM) simplex optimization technique: the GAs are used first to reach the neighborhood of some global extremum, and the NM algorithm then finds it exactly. Playing games with genetic algorithms has been already proposed: it is a means of seeking better strategies in playing repeated games. These algorithms have been applied extensively for solving Nash equilibria of fuzzy bimatrix games with single objective. The experience shows the ability of the GAs to find solutions to equivalent quadratic programming problems without an exhaustive search. In 2002, Chen extends the applications to multiple objective programming problems, without weighting the desired objectives contrary to the Nishizaki-Sakawa models. This lecture is an attempt to consider the complexity of the real situations, when the decision makers are facing to multiple simultaneous objectives in a fuzzy environment. The software MATHEMATICA 7.0.1 is used to implement these techniques in a high-performance computing environment.

#### Brief Biography of the Speaker:

Professor Andre A. Keller is an associate researcher in mathematical economics at CLERSE - Centre Lillois d'Etudes et de Recherches Sociologiques et Economiques - a research unit UMR/CNRS 8019 of the French 'Centre National de la Recherche Scientifique (CNRS)' from the University Lille 1, Sciences et Technologies. Prof. Keller is graduated in econometrics and operations research, and received his PhD in Economics in 1977 from the Universite de Paris I. Prof. Keller taught applied mathematics (optimization techniques), econometrics, microeconomics, theory of games and macrodynamics. His experience centers are on discrete mathematics (graph theory), building and simulating large scale macro-econometric models. Since 1985, his research interest has concentrated on modeling high frequency time-series: spectral properties of usual filters, automatic selection of ARIMA models, efficiency tests. Since 1990, Prof. Keller's research is centered on discrete mathematics (graph theory), stochastic differential games and tournaments, circuit theory of environmental systems, dynamics and optimal control under uncertainties, as in a fuzzy environment. Prof. Keller's publications in journals and proceedings are on model building and game theory, with application to macroeconomics and international finance. Books chapters are on semi-reduced forms of econometric models (Martinus Nijhoff, 1984), econometrics of technical change (Springer and IIASA, 1989), advanced time-series analysis (Woodhead-Faulkner), circuits enumeration in digraphs (Springer, 2008), stochastic differential games (Nova Science, 2009), optimal fuzzy control (InTech, 2009), circuit analysis (Nova Science, forthcoming 2010).



## Plenary Lecture 8

### Magic Wand Approach to Representation of Personal Technologies



**Professor Victor Malyshkin**

Supercomputer Software Department (SSD)  
Institute of Computational Mathematics and Mathematical Geophysics  
Russian Academy of Sciences  
Novosibirsk, RUSSIA  
E-mail: [malysh@ssd.sccc.ru](mailto:malysh@ssd.sccc.ru)

**Abstract:** In this talk I will highlight and present the idea of magic wand as approach to representation new technologies, their implementability, application and use in different object domain. Magic wand approach in its currently implementable form is suggested to be the standard for any new technology representation. How to describe a new technology, how to accumulate and control the active knowledge base constitute the main subject of this talk. It will be a collected view on my past experience reflected in new innovative challenges.

## Plenary Lecture 9

### Formal and Automatic Enforcement of Security by Rewriting



#### Professor Mohamed Mejri

Departement d'Informatique et de Genie Logiciel

Universite Laval, Quebec (QC) Canada

E-mail: [mohamed.mejri@ift.ulaval.ca](mailto:mohamed.mejri@ift.ulaval.ca)

**Abstract:** The literature records various formal and automatic techniques allowing to ensure that a system never violate some given requirements and in particular some security policies. Mainly, we distinguish two groups of approaches: static analysis and dynamic analysis. Static analysis aims to verify software before running them while dynamic analysis techniques check them during their executions. Generally, both of these techniques are needed since they complement each other: There are some properties that could not be verified dynamically and vice-versa. For instance, liveness properties (something good will happen) could not be ensured dynamically. Other properties that depend on some values known only at execution time could not be verified statically. However, static analysis are in most all cases preferable when the problem can be resolved before the execution.

Recently, many researchers have been interested by rewriting techniques in order to gather advantages of both static and dynamic methods. The idea consists in modifying statically a software, so that the new version respects the requested requirements. The rewritten software is generated from the original one by adding, when necessary, some tests at some critical points so that it behaves like requested.

#### Brief Biography of the Speaker:

He received a Ph.D. in Computer Science with General Honors, Computer Science Department, Laval University, Canada.

Currently he is a Full Professor in Computer Science. Computer Science Department, Laval University, Quebec, Canada, he works on computer Security, and contributed in many project worldwide.

He received CIPA Awards/Canadian Information Productivity Awards/2001: MaliCots project (LSFM research group). CIPA'2001. He received Star Professor/Laval University, Canada 2002/ 2003/ 2005/ 2006/ 2008: For the excellent quality of teaching. He was a visiting professor at Fujita's Laboratory Iwate Prefectural University, Iwate, Japan on 2008, for six months doing a joint work with Prof. Hamido Fujita, He got a joint patent on software methodology.



## Plenary Lecture 10

### PLAYWARE: Intelligent Hardware and Software that Creates Playful Experiences



#### Professor Henrik Hautop Lund

Center for Playware

Technical University of Denmark

DENMARK

E-mail: [henrik.hautop.lund@gmail.com](mailto:henrik.hautop.lund@gmail.com)

**Abstract:** This talk will present the design approach for technological tools that may enhance playful interaction for a vast variety of people, e.g. for play, education, cardiac patients, stroke patients, hospitalised children, home care, autistic children, dementia patients, and handicapped. The approach builds upon the development of modular robotics to create a kind of playware, which is flexible in both set-up and activity building for anybody and anywhere. Key features of this design approach are modularity, flexibility, and construction, immediate feedback to stimulate engagement, activity design by end-users, and creative exploration of play activities. These features permit the use of such modular playware by a vast array of users, including elderly and disabled who often could be prevented from using and taking benefits from modern technologies. For instance, the creative play activities with modular playware helps confidence and self-esteem blossom as young children meet success in activities that are fun. The objective is to get any person moving, exchanging, experimenting and having fun, regardless of their cognitive or physical ability levels. By offering exciting activities that entice users to participate, the interactive playware technologies can not only help them reap the physical benefits of exercise, but also provide opportunities for them to learn, share, express feelings, set goals, and function independently.

I will illustrate the design approach by a system composed of different modular robotic devices that by its modularity is used for creating playful experiences in a vast variety of application areas, e.g. music, sport, play and rehabilitation, e.g. most recently for the FIFA World Cup 2010 in South Africa. The system composed of the modular robotic devices engages the user in physical activities, and I will show how it motivates to perform physical activities by providing immediate feedback based upon playful physical interaction with the system. The modularity, ease of use and the functionality of the devices such as modular robotic tiles and cubic I-BLOCKS suit well into these kinds of scenarios, because they can provide feedback in a generic way. It is therefore possible to create applications with different stimuli and to dynamically change parameters to provide immediate feedback to the users. The modularity allows to investigate adaptivity both as changes in the physical structure and in the processing of the modules (e.g. by neural networks).

This gives ample room for the development of playware, i.e. intelligent hardware and software that creates play and playful experiences amongst users of all ages. Indeed, design principles from modular robotics, embodied AI, interaction design and cultural studies allow us to create playware for diverse application fields such as welfare robotics (e.g. home care, physiotherapy, autism therapy, dementia therapy), sport, music, playground play and fitness training. In the presentation, I will show numerous examples from DJ remix music, rock music, physical rehabilitation, playgrounds, soccer, and use in Africa.

#### Brief Biography of the Speaker:

Professor Henrik Hautop Lund, Center for Playware at Technical University of Denmark, is known internationally for his work in bringing robotics to use in novel ways. His approach is to combine modular robotics and modern artificial intelligence to create novel solutions to problems that occupy the citizens of the World, e.g. obesity, rehabilitation, and 3rd World development. He has recently founded the Center for Playware to focus even further on how playful aspects of robotics may provide motivation for any citizen to perform different kinds of interaction with the robots of our future daily life. He chaired the Robots at Play festivals in the open city areas where researchers, artists, entertainers, and citizens meet through playful hands-on experience with robotics in the daily life of the citizens. In all cases, Lund has shown how the combination of a modern artificial intelligence, modular robotics and entertainment may provide novel opportunities in play, rehabilitation, sport, music, teaching, third World development, etc., because the approach provides non-expert users easy access to the technology in a playful and motivating way.

Professor Henrik Hautop Lund has published more than 135 scientific articles in the field of robotics, he has been a member of the Danish Research Council, and he has been invited to present his robotic work in numerous occasions, for instance for the Emperor of Japan at Akasaka Palace in Tokyo. He has been keynote speaker at the major conferences in the field, such as IROS and Ro-Man. He founded and headed the LEGO Lab in 1997-2000. He

founded the RoboCluster industrial promotion organization. He invented the RoboCup Junior robot football game for children, and his Adaptronics group won the RoboCup Humanoids Free Style World Championship 2002 in front of 120.000 spectators. Also, he developed the Laudrup, Høgh & Lund RoboSoccer, which was used at the FIFA World Cup 2010 in South Africa. Further, he developed the RoboMusic in collaboration with World Music Award winner, remix musician Funkstar De Luxe. Professor Lund's work has received world-wide interest from news media, e.g. CNN, BBC and WIRED to name a few, and he was nominated for the award for the best entertainment robots and systems research over the last 20 years at the IEEE International Conference on Intelligent Robots and Systems (IROS).

## Authors Index

Abed, S.	134	Hung, W.-M.	496	Meana, H. P.	85, 164
Adjallah, K. H.	406	Ikura, Y.	226	Mendoza Noriega, J. A.	164
Aleksander, N.	465	Ikeda, D.	366	Michel, D.	412
Alouneh, S.	134	Ishimizu, T.	321	Minemura, H.	158
Amanuma, S.	346	Isokawa, T.	401	Mirenkov, N.	242, 327
Amornsamankul, S.	286, 304	Jaafar, J.	455	Miyatake, M. N.	164
Asada, T.	269, 341	Jeong, H.-C.	222	Modchang, C.	375
Ashour, M. M.	96	Jezewski, J.	122, 128	Mohamed, A. H.	27
Aulagner, G.	412	Ji, S.-G.	222	Mohamed, M. A.	96
Bancila, D.	238	Jiamnapanon, N.	210	Mohammad, Y. F. O.	430
Bandyopadhyay, A.	401	Jirava, P.	388	Mohammed, A. A.	106
Begu, L. S.	426	Kacem, I.	406	Moonchai, S.	56, 187
Borovikova, O.	255	Kamali, S. H.	72	Morioka, A.	366
Calbureanu, M. X.	79	Kamil, K.	465	Muntean, M.-C.	298
Carstea, C.-G.	436	Kaneko, Y.	158	Nakai, D.	276
Chang, T.-H.	176	Kaorapapong, K.	304	Nakamura, K.	366
Chen, C.-W.	335	Kasparova, M.	388	Nakano-Miyatake, M.	170
Chen, C.-Y.	335	Keller, A. A.	351	Nishida, T.	430
Chiba, R.	315	Kerdprasop, K.	472, 484	Nistor, C.	298
Chicos, L.-A.	234, 238	Kerdprasop, N.	472, 484	Nistor, R.	298
Chudtong, M.	152	Khalil, R. K.	96	Novaprateep, B.	193
Conradie, P.	263	Khompungson, K.	193	Oancea, G.	234, 238
Cruz-Perez, D.	85	Kitagami, S.	158	Ogawa, A.	447
Czabanski, R.	122	Komiya, S.	315	Omari, A.	49
Damian, D.	436	Kopecek, P.	251	Ono, K.	204
David, N.	426, 436	Krachodnok, P.	90	Oono, H.	401
Dima, A.	79	Kraipeerapun, P.	286	Panus, J.	490, 508
Doi, A.	204	Krupka, J.	280, 388	Pati, R.	401
El-Bakry, H. M.	478	Krzysztof, D.	465	Patrascu, L.	436
Emsaed, M. A.	139	Kupka, T.	122	Peng, S.-C.	198
Francois, R.	412	Kurematsu, M.	346	Peper, F.	401
Fujimoto, A.	366	Kurkoski, B. M.	164	Perez-Meana, H.	170
Fujita, D.	401	Kushida, K.	341	Petr, P.	280
Fujita, H.	346, 461	Lacharaj, V.	111	Pirkli, J.	490
Garcia, S.	440	Lancea, C.	234, 238	Poltem, D.	193
Ghosh, S.	401	Lee, M. G.	170	Prasad, B.	216
Hakura, J.	346	Lee, W.-I.	335	Precharattana, M.	375
Hashiura, H.	315	Lenbury, Y.	56, 152, 187	Provaznikova, R.	280
Hassan, M. F.	455	Lenbury, Y.	375	Przybyla, T.	128
Hattagam, W.	291, 381	Lin, J.-H.	502	Puckdeepun, T.	455
Hedayati, M.	72	Lin, J.-J.	496, 502	Pukdesree, S.	111
Higuchi, T.	366	Lund, H. H.	514, 520, 526	Rahmani, M.	72
Hirankitti, V.	360	Lungu, M.	79	Ramirez-Gutierrez, K.	85
Hoai An, L. T.	394	Luo, C.-H.	308	Ratanakul, C.	152
Horoba, K.	122	Malciu, R.	79	Ratiu, I.-G.	436
Hsu, S.-C.	176	Mandys, J.	388	Raynal, M.	412
Huang, P.-C.	496, 502	Martin, B.	412	Rebai, M.	406
Huisman, M.	263	Matonia, A.	128	Roj, D.	128

Roman, K.	465	Tabuse, M.	276, 341	Wiwatanapataphee, B.	304
Romo, M.	440	Tagawa, K.	321	Wongsan, R.	90
Sahni, R.	216	Takagi, M.	447	Wrobel, J.	122, 128
Sahu, S.	401	Tanaka, M.	447	Wu, C.-Y.	198
Saleh, K.	33	Tanba, S.	226	Xuan, T. M.	360
Santiago-Avila, C.	170	Tao, P. D.	394	Yamada, K.	447
Sasaki, J.	447	Tarar, S.	44	Yamamoto, S.	341
Sawamoto, J.	116, 158	Teaumroong, N.	291, 381	Yamarat, A.	193
Saybani, M. R.	62	Teng-Amnuay, Y.	210	Yasuda, A.	158
Shih, C.-H.	308	Tokunaga, T.	366	Yoshida, T.	116
Shih, C.-T.	308	Triampo, D.	375	Yoshikawa, A.	366
Singh, A. P.	44	Triampo, W.	56, 187	Yoshioka, R.	242, 327
Singh, S.	44	Triampo, W.	375	Yoshitom, Y.	182, 269, 341
Siripanadorn, S.	291, 381	Tutunea, D.	79	Yotnuan, C.	90
Sirisang, P.	111	Uozumi, T.	366	Yumoto, K.	366
Stamate, V.	234	Vazhenin, A.	418	Zagorulko, G.	255
Sugawara, K.	461	Vazhenin, D.	418	Zagorulko, Y.	255
Sugawara, M.	226	Wah, T. Y.	62	Zaki, F. W.	96
Sui, Y.-C.	335	Wang, T.	67	Zhang, S.	67
Sukstrienwong, A.	38	Watanobe, Y.	242, 327	Zubi, Z. S.	139
Sutinen, E.	526	Wita, R.	210		