Editors:
Prof. Leon Trilling, Massachusetts Institute of Technology (MIT), USA
Prof. D. Perkins, Harvard University, USA
Prof. Dionysios (Dion) D. Dionysiou, University of Cincinnati, USA
Prof. Leonid Perlovsky, Harvard University, USA
Prof. Kent Davey, IEEE Fellow, Editor IEEE Trans. on Magnetics, Austin, TX, USA
Prof. David Landgrebe, Purdue University, USA
Prof. Miguel A. Marino, Distinguished Professor of Hydrology, Civil & Environmental Eng., and Biological & Agricultural Engineering, University of California, CA, USA
Prof. D. L. Russell, Professor of Mathematics, Virginia Tech, USA
Prof. Steven H. Collicott, School of Aeronautics and Astronautics, Univ. West Lafayette,USA
Prof. Marco Ceccarelli, (IFToMM President elect 2008-2011), University of Cassino, IT
Prof. John W. Lund, PE, Professor Emeritus of Civil Engineering,
Past President of the Intern.Geothermal Association, Oregon Institute of Technology, USA

RECENT ADVANCES in ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES

Cambridge, UK, February 21-23, 2009

Proceedings of the 8th WSEAS International Conference on
ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES (AIKED '09)

Artificial Intelligence Series
A Series of Reference Books and Textbooks

ISBN: 978-960-474-051-2
ISSN: 1790-5109

Published by WSEAS Press
www.wseas.org

RECENT ADVANCES in ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES

RECENT ADVANCES in ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES

Proceedings of the 8th WSEAS International Conference on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES (AIKED '09)

Cambridge, UK
February 21-23, 2009

Artificial Intelligence Series
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5109
ISBN: 978-960-474-051-2

RECENT ADVANCES in ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES

Proceedings of the 8th WSEAS International Conference on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES (AIKED '09)

Cambridge, UK
February 21-23, 2009

Artificial Intelligence Series
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

Copyright © 2009, 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: 1790-5109
ISBN: 978-960-474-051-2

World Scientific and Engineering Academy and Society

RECENT ADVANCES in ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES

Proceedings of the 8th WSEAS International Conference on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES (AIKED '09)

Cambridge, UK
February 21-23, 2009

Editors:

Prof. Leon Trilling, Massachusetts Institute of Technology (MIT), USA
Prof. D. Perkins, Harvard University, USA
Prof. Dionysios (Dion) D. Dionysiou, University of Cincinnati, USA
Prof. Leonid Perlovsky, Harvard University, USA
Prof. Kent Davey, IEEE Fellow, Editor IEEE Trans. on Magnetics, Austin, TX, USA
Prof. David Landgrebe, Purdue University, USA
Prof. Miguel A. Marino, Distinguished Professor of Hydrology, Civil & Environmental Engineering, and Biological & Agricultural Engineering, University of California, CA, USA
Prof. D. L. Russell, Professor of Mathematics, Virginia Tech, USA
Prof. Steven H. Collicott, School of Aeronautics and Astronautics, Univ. West Lafayette,USA
Prof. Marco Ceccarelli, (IFToMM President elect 2008-2011), University of Cassino, IT
Prof. John W. Lund, PE, Professor Emeritus of Civil Engineering, Past President of the Intern. Geothermal Association, Oregon Institute of Technology, USA

International Program Committee Members:

Chong Ahn, USA
Raman Akkipeddi, Singapore
Ari Requicha, USA
Fumihito Arai, Japan
Pushan Ayyub, India
Dominik Bell IRIS, Switzerland
Yves Bellouard , Netherlands
Christian Bergaud, France
Claudio Nicolini, Italy
Gary Bernstein, USA
Dieter Bimberg, Germany
Peter Boggild, Denmark
Shuo Hung Chang, Taiwan
M. P. Kirpichnikov, Russia
Jia Chen, USA
Jagadish Chennupati, Australia
Kilwon Cho, Korea
Hee Cheul Choi, Korea
Andy Chung, Korea
James J. Coleman, USA
Ananth Dodabalapur, USA
Lixin Dong, Switzerland
David Elata, Israel
Eniko Enikov, USA
Enrico Stura, Italy
Antoine Ferreira, France
David Ferry, USA
David J. Frank, USA
Michael S. Fuhrer, USA
Michael Gal, Australia
Stephen Goodnick, USA
Valery Gradetsky, Russia
Detlev Grutzmacher, Germany
Sinan Haliyo, France
Bruce Hinds, USA
Saw-Hai Hla, USA
Dean Ho, USA
William Jo, Korea
Francois Julien, France
Young-wook Jun, Korea
Pasi Kallio, Finland
Shashi Karna, USA
Bradley Kratochvil, Switzerland
Sanjay Krishna, USA
Pierre Lambert, Belgium
Piera Poletti, Italy
Jean-Pierre Leburton, USA
Gwo-Bin Lee, Taiwan
Yi-Kuen Lee, USA
Jaejin Lee, Korea
Ching-Fuh Lin, Taiwan
Feng-Huei Lin, Taiwan
Dimitri Litvinov, USA
Chang Liu, USA
Feng Liu, USA
David Lockwood, Canada
Yunfeng Lu, USA
Paolo Lugli, Germany
Pinaki Majumder, USA
Meyya Meyyappan, USA
Saroj Nayak, USA
John O'Brien, USA
Hideo Ohno, Japan
Seong-Ju Park, Korea
Stanley Pau, USA
Hakan Pettersson, Sweden
Ramana Pidaparti, USA
Vladimir Privman, USA
Ganapathiraman Ramanath, USA
Aristides Requicha, USA
John Rogers, USA
Kaiyu Shou, Switzerland
Metin Sitti, USA
Aimin Song, United Kingdom
Arunkumar Subramanian, Switzerland
Yu Sun, Canada
H. Hoe Tan, Australia
Gary Tepper, USA
Fred L. Terry, USA
Maurizio Tormen, Switzerland
Dimos Triantis, Greece
Kevin F. G. Tseng, Taiwan

Preface

This year the 8th WSEAS International Conference on ARTIFICIAL INTELLIGENCE, KNOWLEDGE ENGINEERING and DATA BASES (AIKED '09) was held in the University of Cambridge. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of neural networks, neurobiology and neurosciences, information retrieval systems, image processing, knowledge and information management techniques, database engineering and systems 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.

During this last year we witnessed the growth of the European Union interest in AI. This is an additional proof that it is seen not only as an exciting research area but also as technologies that may solve current European citizens' concerns with several practical problems.

For a discipline which is central to research and also to industry, and which generates interests not only among academicians but also among large companies and government departments and agencies, it is important to look at the market and at its movements.

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

Plenary Lecture 1: Cognitive Reasoning and Recognition for Intelligent Human Interaction based on Mental Cloning 13
Hamido Fujita

Plenary Lecture 2: Agent Based Semantic Analysis 15
George Rzevski

Plenary Lecture 3: Design of Robust Fuzzy Logic Controllers for Complex Non-linear Processes with Time Delay 16
Snejana Yordanova

Plenary Lecture 4: Multi-criterion Decision Making by Artificial Intelligence Techniques 18
Jerzy Balicki

Plenary Lecture 5: Complex Systems Modelling by Rule Based Networks 19
Alexander Gegov

Plenary Lecture 6: Relation between Static and Dynamic Optimization in Computer Network Routing 21
Milan Tuba

Plenary Lecture 7: Towards Ethical Aspects on Artificial Intelligence 22
Liliana Rogozea

Plenary Lecture 8: Towards Opposition and Center-Based Sampling for High-Dimensional Search Spaces 23
Shahryar Rahnamayan

Plenary Lecture 9: Advanced Methods for Text Retrieval 24
Ioana Moisil

Plenary Lecture 10: Computational Intelligence Techniques in Solving Power System Problems 26
Ismail Musirin

Plenary Lecture 11: Semantic Approaches for Web Multimedia Processing and Communication 27
Ashraf M. A. Ahmad

Ant Colony Optimization Meta-Heuristic in Project Scheduling 29
Alexandru-Liviu Olteanu

Distributed Hybrid-Storage Partially Mountable File System 35
Alexandru Radovici, Elena Simona Apostol

Telemedicine and Ethical Dilemmas 41
Liliana Rogozea, Luciana Cristea, Mihaela Baritz, Victoria Burtea

Information Retrieval and the User's Profile. Critical Aspects 46
Maria Rodica Volovici, Daniel Volovici

A Strategy for Parallel Sorting Algorithms Evaluation based on MPI Technology 49
Ioan Z. Mihu, Horia V. Caprita

Web-based Citizens Education for a Healthy Life-Style 55
Ioana Moisil, Carmen Domnariu, Liliana Rogozea

Melancholia Diagnosis Based on Energy Medicine Information and CMAC Neural Network Approach 59
Chin-Pao Hung, Hong-Jhe Su, Shih-Liang Yang

Monetary Mechanism to Propagate Macroeconomics Policies 67
Stefan Alexandru Ionescu, Andreea Raluca Voicu, Alexandru Ionescu

An Investigation in Applying Image Retrieval Techniques to X-Ray Engineering Pictures 73
Raoul Pascal Pein, Joan Lu, John Birger Stav, Miro Ura

An Action Decision Model for Emotions based on Transactional Analysis 79
Hamido Fujita, Natsumi Sawai, Jun Hakura, Masaki Kurematsu

Implementation of a Knowledge Management Tool within a Virtual Organization: the GPT Case Study 89
Paolo Taticchi, Flavio Tonelli, Eduardo Hernandez, Luca Cagnazzo

New Efficient Neural Networks for Fast Record Detection in Databases 95
Hazem M. El-Bakry, Nikos Mastorakis

Design of Robust Fuzzy Logic Controllers for Complex Non-linear Processes with Time Delay 103
Snejana Yordanova

Multidimensional Object Based Image Sequences Segmentation 111
George Petrov, Panayot Iliev, Plamen Tzvetkov

Model Optimisation for Complex Systems using Fuzzy Networks Theory 116
Nedyalko Petrov, Alexander Gegov

Complex Systems Modelling by Rule Based Networks 122
Alexander Gegov

Robust Fuzzy Parallel Distributed Compensation PI Control of Non-Linear Plant 128
Snejana Yordanova, Bilyana Tabakova

Virtualization of Virtual Measurement Machines as Component of Distributed Artificial Intelligence System 134
Andrey Angelov Elenkov

Modelling by Finite Element of the Part-Tool Flexible Technological System Deformations at Superfinishing Process 139
Constantin Buzatu, Adriana Fota, Badea Lepadatescu, Simona Duicu

A Method for Automated Classification of Steel Microstructures Based on Extraction of Informative Parameters and Neural Network Implementation 143
Irina Topalova, Alexander Tzokev, Anton Mihailov

Monitoring MLP's Free Parameters for Generalization 148
Hung Han Chen

Simultaneous Electrochemical Determination of Glue and Thiourea in Copper Refining by Using Artificial Neural Network 154
Efat Rezaei

Identification of Woven Fabrics Defects using Image Processing 159
Seyed Abbas Mirjalili, Esfandiyar Ekhtiyari, Saber Beitollahzadeh

Fast Training MLP Networks with Lo-Shu Data Sampling 165
Hung Han Chen

Expected Progress in the Field of Business Intelligence 170
Zeljko Panian

Prediction of Grid-Connected Photovoltaic System Output Using Evolutionary Programming-ANN Models 176
Shahril Irwan Sulaiman, Titik Khawa Abdul Rahman, Ismail Musirin

Decision-Making Automation Fuzzy Decision-Making in Industry 181
Aziz Soulhi, Said Guedira, Nour-Eddine El Alami

A New Edge Detection Algorithm in TRUS Images 186
Ali Rafiee, Ahad Salimi, Ali Reza Roosta

Hierarchical Data Management in Relational Systems 191
A. Malikov, Y. Gulevskiy, D. Parkhomenko, E. Malikova

Deformation Field Analysis of Magnetic Resonance Images in Alzheimer's Disease 197
B. S. Mahanand, M. Aswatha Kumar

Real Time Medical Telemonitoring of Sustainable Health Care Measuring Devices 202
Carmen Aurora Bulucea, Marius Constantin Popescu, Cornelia Aida Bulucea, Anca Patrascu, Gheorghe Manolea

About of PI Fuzzy Controller in DC to DC Power Converters 208
Jenica Ileana Corcau, Eleonor Stoenescu, Teodor Lucian Grigorie

Possibilistic Evidential Clustering 212
Anas Dahabiah, John Puentes, Basel Solaiman

Digestive Casebase Mining Based on Possibility Theory and Linear Unidimensional Scaling 218
Anas Dahabiah, John Puentes, Basel Solaiman

Hybrid Meta-EP-ANN Technique for Lightning Prediction under Malaysia Environment 224
D. Johari, T. K. A. Rahman, I. Musirin, N. Aminuddin

Using Artificial Neural Networks for Pattern Recognition of Downhole Dynamometer Card in Oil Rod Pump System 230
J. A. M. Felippe de Souza, Marco A. D. Bezerra, M. de A. Barreto Filho, Leizer Schnitman

Multiagent Immune Evolutionary Programming Based Technique for Power System Loadability Improvement Using ORPP 236
N. Aminudin, T. K. A. Rahman, I. Musirin, D. Johari

Explorative Steady State Genetic Algorithms and Elitist Genetic Algorithms for Optimal Reactive Power Planning 242
M. F. Mohd Kamal, I. Musirin, T. K. A. Rahman

Ant Colony Technique for Transformer Tap Changer Setting Optimization 248
M. R. Kalil, I. Musirin, M. M. Othman, T. K. A. Rahman

Solving Reactive Power Control Problems in a Stressed Power System Network Using Evolutionary Computation Technique 254
N. R. H. Abdullah, I. Musirin, M. M. Othman, T. K. A. Rahman

The Effects of Learning Behaviors in Classroom Goal Orientation and Control Ideology: Using Structural Equation Modeling 260
Parvin Kadivar, Arabzadeh, M, Javadi, S, Farzad, V

Knowledge Delivery Methods of Mathematics to Engineering Students in Developing Countries 266
Nabil Moussa

A Fast Iterative Method for Dominant Points Detection of Digital Curves 271
Cecilia Di Ruberto, Andrea Morgera

A New Method for the Positioning and Matching of Shape Outlines 279
Cecilia Di Ruberto, Marco Gaviano, Andrea Morgera

A Simple Algorithm for Constructing Perfect Monolinear Sona Tree Drawings, and its Application to Visual Art Education 288
Yang Liu, Godfried Toussaint

Optimizing Material Flows into the Architecture of a Flexible System of Integrated Manufacturing CIM 295
Adriana Fota, Constantin Buzatu, Badea Lepadatescu

Modeling and Evaluating of Emotional Processes 301
Khalil Shihab, Nida Chalabi

Optimizing OSPF Routing Using Accelerated Iterative Heuristic 308
Sadiq M. Sait, Mohammed H. Sqalli, Syed Asadullah

Design of an Active Power Filter using Adaptive Tabu Search 314
T. Narongrit, K.- L. Areerak, A. Srikaew

Multi-Criterion Decision Making by Artificial Intelligence Techniques 319
Jerzy Balicki

Data Mining - Support for Making Decisions in Public Institutions 325
Bara Adela, Lungu Ion, Oprea Simona Vasilica

Decision Support Systems – Improving Performance With Object Oriented Implementation 331
Bara Adela, Diaconita Vlad, Lungu Ion, Velicanu Manole

Determination of Part Orientation to Minimize Post-Machining in Laminated Object Manufacturing Using Genetic Algorithm 337
Dae Keon Ahn, Seok Hee Lee, Jeong Il Song, Soon Man Kwon

Recommendation System based on the Clustering of Frequent Sets 343
Andrei Toma, Radu Constantinescu, Floarea Nastase

Knowledge Management in Romanian Software Development Organizations 348
Iuliana Scorta, Alexandra Florea

Co-Evolutionary Automatically Defined Functions in Genetic Programming 354
Anthony Lukas, Franz Oppacher

Estimation and Representation of Non-linear Static Functions using Non-Orthogonal Continuous Wavelets 360
M. P. Pushpalatha, N. Nalini

Cost Reduction on Roots Pre-Isolation 366
Calin Alexe Muresan

Bagging and Boosting Algorithms for Support Vector Machine Classifiers 372
Noritaka Shigei, Hiromi Miyajima

Multi-Modal and Multi-Purpose Case-Based Reasoning in the Health Sciences 378
Mobyen Uddin Ahmed, Shahina Begum, Peter Funk, Ning Xiong

3D Motion Data Analysis and Visualisation for Technology-Enhanced Learning and Heritage Preservation 384
Kia Ng

Robust Image Watermarking Based on Genetic Algorithm in Multiwavelet Domain 390
Prayoth Kumsawat, Kitti Attakitmongcol, Arthit Srikaew

Auto-Detection of Non-Isolated Pulmonary Nodules in X-Ray CT Images 396
Noriyasu Homma, Satoshi Shimoyama, Masao Sakai, Tadashi Ishibashi, Makoto Yoshizawa

Time Series Applied in Romanian Economy 402
Daniela Damian, Neculai Patrascu, Claudia-Georgeta Carstea, Lucian Patrascu, Ioan-Gheorghe Ratiu, Nicoleta David

Advanced Methods for Data Mining 407
Nicoleta David, Neculai Patrascu, Claudia-Georgeta Carstea, Lucian Patrascu, Ioan-Gheorghe Ratiu, Daniela Damian

An Empirical Determination of Samples for Decision Trees 413
Hyontai Sug

Control Network Programs and their Execution 417
Kostadin Kratchanov, Emilia Golemanova, Tzanko Golemanov

Control Network Programming: Static Search Control with System Options 423
Kostadin Kratchanov, Tzanko Golemanov, Emilia Golemanova

Any Identifiable Knowledge Structures from Traversal Behavior in Hypertext Environment? 429
Perwaiz B. Ismaili

An Energy-Based Vehicle Tracking System using Principal Component Analysis and Unsupervised ART Network 435
A. Srikaew, P. Kumsawat, K. Attakitmongcol, N. Sroisuwan, C. Sotthithaworn

Critical Implementation Factors in Higher Education ERPs 441
Ana-Ramona Bologa, Mihaela Muntean, Gheorghe Sabau, Iuliana Scorta

Grammatical Inference for Robotic Self-Assembly – Basic Methodology 447
Aboubekeur Hamdi-Cherif, Chafia Kara-Mohammed

Knowledge Management in Intelligent Manufacturing Enterprise 453
I. Dumitrache, S. I. Caramihai, A. Stanescu

Artificial Intelligence and 'Waves of Complexity' for Urban Dynamics 459
Ning Wu, Elisabete A. Silva

Data Driven Decision Support to Supermarket Layout 465
Ibrahim Cil, Derya Ay, Yusuf S. Turkan

Identifying "Promising" Internet Business Applications Using Artificial Neural Networks 471
Maitrei Kohli

How an "Incoherent Behavior" inside Generic Hardware Component Characterizes Functional Errors 477
Bruno Monsuez, Franck Vedrine, Micaela Mayero, Nicolas Vallee

Relation between Static and Dynamic Optimization in Computer Network Routing 484
Milan Tuba

A Comparative Assessment of Ant Colony Optimization Algorithms for the Minimum Weight Vertex Cover Problem 490
Raka Jovanovic, Milan Tuba

Making Predictions of the Profitability on the Financial Markets Using Discriminant Analysis 495
Stefan Alexandru Ionescu, Cristiana Stefania Murgoci, Camelia Monica Gheorghe, Emilia Ionescu

Business Process Measurement Model Based On the Fuzzy Multi Agent Systems 501
Mahdi Pakseresht, Mir Ali Seyyedi, Mehran Mohsen Zade, Hamid Gardesh

Towards Ethical Aspects on Artificial Intelligence 507
Liliana Rogozea

E-cards and e-Health - An Ethics Point of View 513
Cristina Borzan, Liliana Rogozea, Carmen Domnariu, Florin Leasu, Mocean Floarea, Dana Minca

Researches Concerning the Data Processing used in Feeding and Dosing Systems Optimization 518
Luciana Cristea, Mihaela Baritz, Liliana Rogozea, Mihai Manescu, Diana Cotoros, Angela Repanovici

SMART LIBRARY: RFID Implementation in Libraries 523
Angela Repanovici, Mihai Turcanu, Luciana Cristea, Mihaela Baritz, Ioana Moisil

Statistical Screening for the Analysis of Adult and Elderly People Optometry Visual Behaviour 527
Mihaela Baritz, Luciana Cristea, Diana Cotoros, Liliana Rogozea

Center-Based Initialization for Large-Scale Black-Box Problems 531
Shahryar Rahnamayan, G. Gary Wang

Plenary Lecture 1

Cognitive Reasoning and Recognition for Intelligent Human Interaction based on Mental Cloning

Professor Hamido Fujita
Iwate Prefectural University (IPU)
JAPAN
Email: issam@soft.iwate-pu.ac.jp

Abstract: This plenary Lecture; is to high light on the importance of human nature collective behavior on intelligent interaction between man and machine. We have investigated on different disciplinary, (philosophical, physiological, cultural, physiognomy, and technical) views that collectively reflect the behavioral reasoning of human emotional feature interaction with machines (i.e., computer), this is essential to have mutual effective engagement between human and machine based on observing and examining the user from different views reflecting the emotional behavior of the user. The system will be sensitive to emotion related attributes that through integrated conceptual views, representing these attributes, we can be able grasp the emotional transition state of user engagement with the system. Emotion recognition is one of the most important components of emotional intelligence and it has a direct effect on our ability to make optimal decisions (along with the ability to utilize emotions to make decisions), any attempt by computer scientists to model human interaction should, at least in part, be founded on an accurate identification of affective states. It is suggested that by ignoring the emotional component intrinsic to human decision-making, we have been missing valuable information that could potentially lead to inadequate interactive models.

These concepts are the basis of what we called mental cloning. A concept introduced by me through a project. This project is to establish a system as a virtual world to re-create a Miyzawa Kenji virtual world (famous Japanese writer dead on 1930) based on cognitive model of his personality and inner thinking). However, the Kenji system is currently be modified and adapted into a health care system, that this plenary lecture is trying to introduce.

The objective is to have users (i.e., patients) who are attending a hospital (or they can do it from their home using computer link), to do all transaction of 1st level diagnosis before going to the actual health examination. In this level, based on mental cloning of medical doctors in that hospital, and based on their previous case studies, and experiences to examine patients the system would practice this diagnosis on patient as if the actual doctor are doing. All doctor cases studies have been collected and categorized into the system according to levels and type. The solutions or induced scenarios by the virtual doctors to the patients have been abstracted to distinguishing its central part (primary) from surrounding (secondary) parts. It first finds the solution of the central part, and then refines the solution by considering the secondary related parts. Medical doctors' knowledge has been classified according to categories. The system is been divided into our related parts.

The 1st part is to create a hologram (or virtual 3D face on a display) that produce emotional character of a certain human defined personality, we use in this experiment actual employed medical doctor, the system will produce generated animated face emotionally talk and act as the medical doctor themselves, and who are currently working in the hospital. These animated characters reflecting the main interface the patient would look through and through it the virtual medical doctor would establish the best engagement to extract the current status of the subject patient. This part is working with part 4 of the system. Together part 1 and part 4 represent the mental cloning of the medical doctor.

The 2nd part reflects the interaction of user (patient) emotional engagement states, by observing the user mental transition states (i.e., trace), that been recorded and analyzed by Active Appearance model system through a camera. A high resolution camera would collect images from the user (along with voice as in part 3). These frame streams of video are analyzed though what is called as active appearance model, so the system would collect user mental engagement with the doctor and accordingly, can estimate the user appearance state.

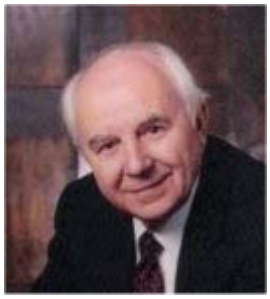
The 3rd part is related to the voice reasoning, to produce with emotion a voice reflecting the context in hand, and to recognize it as it heard from the observed user. Also, this part would produce the output voice of the virtual medical doctor to speak emotionally the generated (in part 4) scenarios.

Through Part 2 and Part 3 information is collected by the system (virtual doctor), to create a cognitive model of the subject patient. Such that to create the problem space that the system would use to navigate to the best match and accordingly the best scenario to use for diagnosis. When a user talk, the face emotional states, along with emotional states and the words are recognized by the system as information through it the system would find the best scenarios and corresponding cognitive model to use for interacting with the subject user.
The 4th part is to produce the synthesis of the scenario that make the user and system been actively engaged. This would be based on creating a cognitive interaction between the human subject and the system based on transition analysis.
This lecture is to bring into the audience the needs for such way of metaphoric thinking to bring user emotional status view to be part of the design views that to be integrated with other parts of the system.

Brief Biography of the Speaker: Dr. Hamido Fujita, is a professor at Iwate Prefectural University(IPU), Iwate, Japan.
He is the director of Intelligent Software Laboratory.
He took his Ph.D from Tohoku University, Sendai, Japan on 1988.
He worked at Tohoku University as visiting Professor on late eighties, and then joined University of Tokyo, RCAST as Associate Professor, on 1990_1993, and then he moved to Canada, as visiting Professor at the University of Montreal, IRO, till 1997.
He then moved to Japan to become a committee member to establish Iwate Prefectural University on 1997. Then after he joined Iwate Prefectural University (IPU), Faculty of Software and Information Science, as professor and head of Information System Division. He is directing at IPU two laboratories, Intelligent Software Laboratory and Cognitive Systems Laboratory. He was a committee of Establishing Graduate School of Software Science, of IPU.
He has directed and led many project sponsored by the Ministry of Science, Education and Culture of Japan, and others from International sponsors and Japanese company sponsors project on new software methodologies.
Also, he is the founder of SOMET organization.
He published many books and journal papers, and participated as speaker in many conferences worldwide. Also, he gave invited talks at many universities in EU, and North America. He has supervised Ph.D students jointly with University of Laval, University Technology, Syndey(UTS), He is also Professor at the University of Laval, Quebec, Canada supervising Graduate Studies students, he was a visiting Professor CRI at the University of Paris_1, Sorbonne, 2003~2004, working with Prof. Colette Rolland. He worked as opponent for Stockholm University, Sweden co-supervised students with Prof. Love Ekenberg He also worked with UTS, CCS group led by Prof. Ernest Edmonds and co-supervised Ph.D students. He published books in IOS press. He guest edited several special issues on International Journal of Knowledge based systems, Elsevier. Also, he has editor role in this journal since 2008. Also, he guest edited Transaction of Internet Research,
He is currently heading a cognitive Miyzaza Kenji project in Intelligent HCI, and a project related to Mental Cloning as an intelligent user interface between human user and computers, MEXT (Ministry of Education, Culture, Sports, Science and Technology).

Plenary Lecture 2

Agent Based Semantic Analysis



Professor George Rzevski
Complexity Science and Design, The Open University, UK
Founder, Magenta Corporation, London, UK and Samara, Russia
E-mail: rzevski@googlemail.com

Abstract: The speaker will describe a new method for semantic analysis of text using multi-agent technology. The problem of semantic analysis is reformulated as the allocation of meanings to words and software agents are given the task to negotiate the matching. A comprehensive ontology contains general knowledge on text understanding, language oriented rules and specific knowledge on the problem domain. Every word in the text under consideration is given the opportunity to autonomously and practically search for its own meaning consulting knowledge available in ontology.
To simplify the process of extracting meanings, the method includes an initial morphological and syntactic analysis of the text, followed by semantic analysis. After that, a pragmatics program implements user-defined applications using the semantics descriptor, which has been generated during semantic analysis.
The method has been commercially applied to abstract selection.

Brief Biography of the Speaker: George Rzevski is Emeritus Professor of the Open University, Milton Keynes, UK, engaged in research into Complexity Science Applications and Multi-Agent Technology. He is also Founder of Magenta Corporation Ltd, London, UK and Samara, Russia, an international company developing large-scale intelligent multi-agent systems for applications such as logistics, e-commerce, semantic search and knowledge discovery. George has edited nine books and published a very large number of papers in the areas of Applied Complexity Science, Design, Artificial Intelligence, Multi-Agent Technology and Information Society.

Plenary Lecture 3

Design of Robust Fuzzy Logic Controllers for Complex Non-linear Processes with Time Delay

Assoc. Prof. Snejana Yordanova
Technical University of Sofia (TUS)
BULGARIA
E-mail: sty@tu-sofia.bg

Abstract: The fuzzy logic controllers (FLCs) mark a considerable progress in controlling complex, non-linear, time-varying processes satisfying the high system performance demands. Since their emergence in the area of process control the FLCs design is constantly being improved laying it out on theoretical grounds and making it more general and simple. Different FLCs structures and approaches have been suggested for treating together fuzzy system stability and uncertainty for the purposes not only of analysis but also of design.

The aim of the plenary lecture is to present some results from the research of the author and her team on development and implementation of various types PI-like FLCs for robust control of complex industrial plants with time delay. An effort has been made to treat together in the frequency domain the stability and the performance of a fuzzy control system of a plant with time delay and model uncertainties, provoked by plant complexity and shift of the operating point along the smooth non-linear plant characteristics due to disturbances, changes in the operating mode and time-varying plant properties.

Robust stability and robust performance criteria are derived by extension of the Popov stability criteria for the case of a fuzzy control system and combining it with robustness considerations, using estimated by experts simple approximate nominal plant model and plant uncertainties model. On their basis a simple and objective FLC design and parameter tuning procedures are developed.

First the approach is applied to the design of a single input fuzzy controller (SI FC). The SI FC, based on the signed distance as a sole input, is promising in ensuring the fuzzy system stability and robustness as they have 1-D uniquely determined rule base - that is, a reduced number of tuning parameters), a sector bounded non-linear control curve - this facilitates the application of Popov stability criterion and the Morari robustness approach, which suit the plant description with model uncertainty and time delay.

Two types of process PI SI FC are investigated. They both consist of a input fuzzy unit (FU) - sector bounded static non-linearity, and a classical position PI controller - dynamic LTI part. The first type of PI SI FC is an incremental PI with the signed distance as a sole input and a LTI part – the augmented plant that includes the pre and post processing units, which together comprise a position PI controller. The second type of PI SI FC is a position PI controller with the system error as a single input and a classical position PI controller after the FU. It avoids the problems, related to the computing the derivative of error signal. In both cases the whole LTI – position PI and plant, is stabilised by a feedback via a gain, which is a basic requirement for application of the Popov stability criterion. Then the initial plant model multiplicative uncertainty is transmitted to uncertainty disks around the Nyquist plot of the LTI part with nominal plant model and the robust stability and the robust performance criteria are derived.

Next, this approach is applied to the simple two input FLC with incremental PI algorithm. First the equivalent incremental PI SI FC is designed on the basis of the du-e projection of the FLC control curve in the plain of the rate of control du as function of the system error e. Then the initial FLC's parameters are obtained – all equal to the parameters of the incremental PI SI FC except the denormalisation factor, which is decreased by ten to compensate the fuzziness of the du-e projection around the steady state point (e-0, de=o, du=0).

Further improvements on the performance of the system with the FLC or the SI FC are searched designing a plant predictor in the feedback by the help of ANN in order to reduce the effect of the plant time delay.

The design procedures are applied to various industrial plants – a laboratory furnace, a laboratory water heating plant and an anaerobic biological degradation process in wastewater treatment.

Results from simulation and real time control using MATLABTM facilities allow to estimate the various fuzzy control systems performance as well as to compare it with the performance of designed ordinary PI and internal model controller systems.

Brief Biography of the Speaker: Snejana Yordanova is a MEng in Electrical Engineering (Automatic Control) and Ph.D. holder from the Technical University of Sofia. She is a full-time Associate Professor with the Department of Process Control, Faculty of Automation, TUS. Currently Mrs. Yordanova is the chief TUS ECTS expert. She has been a Vice Dean of the English Language Faculty of Engineering and a Vice Head of the Dept. of Process Control. Her teaching activity is related to process control, fuzzy control, control systems, elements of industrial automation, modelling and simulation, MATLAB. Mrs. Yordanova has scientific and research interests in application of the robust, fuzzy logic and neural network approaches to system modelling, simulation and control under uncertainties in the areas of oil refining, milk processing, wastewater treatment; measurement systems; thermal power plants. Her total number of publications is over 120, most of which in journals such as Int. Sc. J. of Computing, WSEAS Trans. on Systems, WSEAS Trans. on Circuits and Systems, J. of Electrical and Electronic Engineering, Australia, IEEE Trans. Instrum. and Measurement, Transactions of the Institute of Meas. and Control, Journal of Intelligent & Fuzzy Systems, Int. J. of Automation and Control, Advances in Physics, Electronics and Signal Processing Applications, Chemical & Biochemical Engineering Quarterly, Bioprocess Engineering, in Bulgarian journals - Problems of Eng. Cybernetics and Robotics, Automatica & Informatics, Proceedings of the Technical University of Sofia, Technical Review, Electrical Engineering and Electronics, etc. She has published also 8 textbooks and 3 manuals in Bulgarian and in English. Mrs. Yordanova has participated in many conferences, congresses and symposia worldwide and also in 17 research and education projects (6 international). She is now the supervisor of 2 Ph.D. students. Mrs. Yordanova is a member of the Union of Automatics and Informatics in Bulgaria and the World Scientific and Engineering Academy and Society (WSEAS). She has been the coordinator of 6 Erasmus-Socrates projects and a guest lecturer in La Coruna and Navarra Universities, Spain, in Genova University, Italy, Linkoping University, Sweden, Portsmouth University, UK, Beja University, Portugal. She is a member in many organising and international scientific committees of various conferences (WSEAS, IDAACS, IFAC, UIEEE, “Challenges in Research and Education of 21-st century”- Bulgaria, etc.), a reviewer of a number of journals (WSEAS, Automatica, etc.) and co-editor of proceedings.

Plenary Lecture 4

Multi-criterion Decision Making by Artificial Intelligence Techniques

Associate Professor Jerzy Balicki
Naval University of Gdynia
Computing Science Department, ul. Smidowicza 69
81-103 Gdynia, Poland
E-mai: J.Balicki@amw.gdynia.pl

Abstract: Decision making for complex systems are based on multi-criterion-optimisation. For instance, a task assignment in a distributed computer system may reduce both the total cost of a program run and a workload of the bottleneck computer. Moreover, it can decrease the cost of computers if a selection of the computer sort is carried out. A total amount of the system performance is another measure that can be minimized by task distribution. The probability that all computers remain fault-free during the execution of the modules assigned to computers is the first criterion of evaluation task assignments.
Above benchmark problem can be formulated as a multiobjective combinatorial optimisation question, which is solved by an approach based on artificial intelligence. It is applied for finding the subset of Pareto-optimal solutions. Genetic algorithms, evolutionary algorithms, evolution strategies and genetic programming are the alternative evolutionary approaches to the modern metaheuristic multicriteria optimisation methods such as simulated annealing, tabu search or Hopfield models of neural networks. Especially, genetic programming paradigm is implemented as a genetic algorithm written in the Matlab language. Chromosomes are generated as the Matlab functions and then genetic operators are applied for finding Pareto-suboptimal task assignment. Results are compared with outcomes obtained by an adaptive evolutionary algorithm.

Brief Biography of the Speaker: Jerzy Balicki received the M.Sc. and Ph.D. degrees in Computer Science from University of Military Technology, Warsaw, Poland in 1982 and 1987, respectively. Then, he achieved habilitation D.Sc. from Technical University of Poznan in 2001. He was admitted as a university professor at Naval University of Gdynia in 2002. He is an author of three books and more than 120 scientific papers related to artificial intelligence, distributed computer systems, and decision support systems.

Plenary Lecture 5

Complex Systems Modelling by Rule Based Networks

Professor Alexander Gegov
University of Portsmouth
School of Computing, Buckingham Building
Portsmouth PO1 3HE
United Kingdom
E-mail: alexander.gegov@port.ac.uk

Abstract: The notion of complexity has recently become a serious challenge to scientific research in a multi-disciplinary context. For example, it is quite common to find complex systems in biology, cosmology, engineering, computing, finance and other areas. However, building models for complex systems is often a difficult task.
There are two main aspects of complexity – quantitative and qualitative. The quantitative aspect is usually associated with a large scale of an entity or a large number of units within this entity. The qualitative aspect is often characterised by uncertainty in the knowledge about an entity.
A natural way of coping with quantitative complexity is to use the concept of a general network. The latter consists of nodes and connections, whereby the nodes represent the units within an entity and the connections reflect the interactions among these units. In this case, the scale of the entity is reflected by the overall size of the network, whereas the number of units is given by the number of nodes.
An obvious way of dealing with qualitative complexity is to use the concept of a rule based network. The latter consists of nodes and connections, whereby the nodes are rule based systems and the connections reflect the interactions among these rule based systems. In this case, the uncertainty in the knowledge about an entity is reflected by the underlying rules.
The lecture consists of ten sections. The first section discusses complexity as a systemic feature and the ability of rule based systems to handle different attributes of complexity. Section 2 reviews several types of rule based systems in the context of systemic complexity, including systems with single, multiple and networked rule bases. Section 3 introduces the novel concept of rule based networks by means of formal models such as if-then rules and integer tables, Boolean matrices and binary relations, grid and interconnections structures, incidence and adjacency matrices, and block schemes and topological expressions. Section 4 presents basic operations on nodes in rule based networks, including merging and splitting in horizontal, vertical and output context. Section 5 describes some structural properties of node operations in rule based networks such as associativity of merging and variability of splitting in horizontal, vertical and output context. Section 6 illustrates some advanced operations on nodes in rule based networks, including node transformation for input augmentation, output permutation and feedback equivalence as well as node identification in horizontal, vertical and output merging. Sections 7-8 show the application of the theoretical results from Sections 4-6 in feedforward rule based networks with single or multiple levels and layers as well as in feedback fuzzy networks with single or multiple local and global feedback. Section 9 gives an overall evaluation of rule based networks in relation to rule based systems within the Matlab software environment using fuzzy rules. The last section highlights the theoretical significance, the application areas and the methodological impact of rule based networks in the context of a general evaluation of the lecture contents.

Brief Biography of the Speaker: Alexander Gegov is Senior Lecturer in the School of Computing at the University of Portsmouth. He holds a PhD in Control Systems and a DSc in Intelligent Systems – both from the Bulgarian Academy of Sciences. His research interests are in the theory of computational intelligence and complex systems as well as their application for modelling, simulation and control in areas such as transport networks and the environment. He has published his main research results in complex systems in a number of international journals such as the International Journal of Control and Systems & Control Letters. He is also the sole author of two books – the first one in the Kluwer Series in Intelligent Technologies in 1996 and the second one in the Springer Series in Fuzziness and Soft Computing in 2007. He has been reviewing papers for a number of journals in computational intelligence such as IEEE Transactions on Fuzzy Systems and the International Journal of Fuzzy Sets and Systems as well as research proposals to the Australian Research Council. He was first prize winner for young researchers of the Bulgarian Union of Scientists in 1996, invited lecturer to the NATO Advanced Study Institute on Soft Computing in 1997, guest researcher for the EU Project on Fuzzy Algorithms for

Multiple-Input-Multiple-Output Systems and invited presenter at the UK House of Commons Conference on Promoting Young Researchers in 2000. He was also tutorial presenter at the IEEE International Conference on Fuzzy Systems in 2007, invited lecturer at the EPSRC International Summer School in Complexity Science in 2007, plenary speaker at the WSEAS International Conference on Fuzzy Systems in 2008 and tutorial presenter at the IEEE International Conference on Intelligent Systems in 2008. He is a member of and the UK Higher Education Academy, the International Federation of Automatic Control, the European Society for Fuzzy Logic and Technology and the European Association for Promotion of Science and Technology.

Plenary Lecture 6

Relation between Static and Dynamic Optimization in Computer Network Routing

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

Abstract: Computer network routing is a very important and interesting optimization problem. Many different routing algorithms have been used over the years on the Internet, often with unexpected problems.
Dynamic systems, i.e. systems that change over time, can be optimized statically with a fixed solution that corresponds to some average system state, or dynamically where the solution tries to follow the system change over time. It is a normal expectation that dynamic optimization has to give better results than a static one. Dynamic optimization is more complex, requires more computation, more advanced methods, but is superior to static optimization because it can always be transformed to the static case simply by neglecting change of the system in time and selecting a single state as a representative. However, that expectation that dynamic optimization gives better results than static one applies only to the perfect dynamic optimization, which is impossible in practice. It takes some time to collect information about the system current state, and optimization is always done with that obsolete information. This situation is examined on computer network routing.
By complete mathematical analysis of a simple network, we show that dynamic routing gives better results than static, as expected, but that the margin is much smaller then intuitively expected. Further analysis shows that that minor advantage can easily be lost if there is even a small error in the dynamic routing tables, and actually dynamic routing can easily become worse than static. It takes time to collect information about network traffic . By the time routing tables are calculated, they are already obsolete; they are about some previous condition on the network, not the current one. Quantitative analysis shows that delays in building routing tables can affect dynamic routing performance unexpectedly strongly. This leads to the qualitative recommendation: "Trying to optimize too hard will make things worse. Dynamic routing should not try to adapt to traffic changes very fast." This hypothesis is accepted today and implemented in routing algorithms.

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 1987 he was a graduate student and teaching and research assistant at Vanderbilt University in Nashville and Courant Institute of Mathematical Sciences, New York University. From 1987 to 1993. he was 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 Associate professor of Computer Science and Director of Computer Center at University of Belgrade, Faculty of Mathematics, and from 2004 also Professor of Computer Science and Dean of the College of Computer Science, Megatrend University Belgrade. He was teaching about 20 graduate and undergraduate courses, from VLSI Design and Computer Architecture to Computer Networks, Image Processing, Calculus and Queuing Theory. His research interest include mathematical, queuing theory and algorithmic optimizations applied in computer networks, image processing and combinatorial problems. He is the author of more than 60 scientific papers and a monograph. He was coeditor or member of the board of editors of number of scientific journals and conferences. Member ACM 1983, IEEE 1984, AMS 1995, New York Academy of Sciences 1987.

Plenary Lecture 7

Towards Ethical Aspects on Artificial Intelligence

Professor Liliana Rogozea
University Transilvania of Brasov
29 Eroilor Street, Brasov, RO-500036
Romania
E-mail: r_liliana@unitbv.ro

Abstract: Ethics become more and more important in our life. According to our development, a number of new dilemmas appear in ethical field, related to environment, e-communication, respecting human rights and, of course, artificial intelligence.
Society development and all knowledge and tools used in this purpose put a number of ethics problems.
This paper tries to present the role of ethics in developing artificial intelligence, and how the artificial intelligence could change our perspective, because artificial intelligence in fact is all around us.
As human decision makers we try to determinate what the moral problems are and how we can use artificial intelligence to make good decision not only for one person, but also for the society.
It could be an interesting challenge to develop a software for helping us to take the best decision, but we are sure that it could be inefficient and not enough powerful, because it can't appreciate all aspects and because a lot of mind properties can't be, yet, reproduced by artificial intelligence.
Our conscious, our ethical judgment could develop the trap who could be establish in our world; it becomes more and more clear that not only the people must have ethical rights, but also the other creatures – natural or artificial who "live" on our planet.
The important issues which must be respected are: honesty, selflessness, serenity, the right to be use in a peaceful way, respect and a decent "death". Also, it becomes more and more important to recognize the importance, the role and the place of this intelligence in our society, which is not a substitute for human intelligence.
Even if the ethical issue have subjective and emotive components and it is obvious that is not possible to develop a pattern for all ethical dilemmas, we think that is possible to develop some standards not only for human behaviour, but also for artificial intelligence tools used in our life, standards which could be part of human rights.
Artificial intelligence is an important part of our life, but we are sure that the possibility of acquiring the domination of AI over the humanity is only a myth. During the time, the progress helps society but also put a number of ethical problems. In the academic society, like in real life, the process of using different kind of power are complex, and even if it is about the robots, the computer or other artificial intelligence tools the ethical problems are not only theoretical but also practical, it is not only a concept, but it is also a practical support for our life.

Brief Biography of the Speaker: Professor – chief of Health Promotion, Human Behaviour, Ethics and History of Medicine Department, General Chancellor at the University Transylvania Brasov.
She is member in International Society of Biometrics, member in International Society of Clinical Biostatistics, member in International Society of History of Medicine and editor coordinator of 2 Medical Journal.
She published 21 books like author or co-authors, published in Romania, at the HIMSS, i-technonline
She participates at more than 50 conferences and published 38 papers in extensor at the conference and 72 articles in journals, in the ethics, human behaviour, health promotion and history of medicine.
She was involved in 15 projects like coordinator and member.

Plenary Lecture 8

Towards Opposition and Center-Based Sampling for High-Dimensional Search Spaces

Assistant Professor Shahryar Rahnamayan
University of Ontario Institute of Technology (UOIT)
Faculty of Engineering and Applied Science, Oshawa, CANADA
E-mail: Shahryar.Rahnamayan@uoit.ca

Abstract: Footprints of the opposition concept can be observed in many areas around us. But it has sometimes been called by different names. Opposite particles in physics, complement of an event in probability, absolute or relative complement in set theory, and theses and antitheses in dialectic just are some examples to mention. Recently for the first time, Opposition-Based Learning (OBL) was proposed and then the opposition-based methods have been introduced in different artificial intelligence areas. All of them have tried to enhance searching or leaning process by utilizing the opposition concept. Opposition-based evolutionary algorithms, opposition-based neural networks, and also opposition-based reinforcement learning are some efforts in this direction. The main idea behind OBL is the simultaneous consideration of a candidate and its corresponding opposite candidate in order to achieve a better approximation for the current solution. The first and second parts of this lecture introduce the opposition-based sampling and its applications in various soft computing techniques and center-based sampling, respectively.
Population-based algorithms, such as Differential Evolution (DE), Particle Swarm Optimization (PSO), Genetic Algorithms (GAs), and Evolutionary Strategies (ES) are commonly used approaches to solve complex problems from science and engineering. They work with a population of candidate solutions. In this lecture, a novel center-based sampling is introduced for these algorithms. Reducing the number of function evaluations to tackle with high-dimensional problems is a worthwhile attempt; the proposed center-based sampling can open a new research area in this direction. Our simulation results confirm that this kind of sampling, which can be utilized during population initialization and/or generating successive generations, can be valuable in solving high-dimensional problems efficiently. Quasi-Oppositional Differential Evolution (QODE) will briefly be discussed as an evidence to support the proposed sampling theory. Finally, the opposition-based sampling and center-based sampling will be compared in this lecture.

Brief Biography of the Speaker: Dr. Shahryar received his B.Sc. and M.Sc. degrees both with honors in software engineering from Shahid Beheshti University, Iran. He is holding a PhD degree in evolutionary computation from University of Waterloo, Canada. Opposition-based differential evolution (ODE) was proposed in his PhD thesis. He was a chief research manager at OMISA Inc. (Omni-Modality Intelligent Segmentation Assistant); a company which develops innovative software for medical image segmentation. Before joining to faculty of engineering and applied science at UOIT, Canada, as a tenure-track faculty member, he was a postdoctoral fellow at Simon Fraser University (SFU), Canada. His research includes evolutionary computation and image processing. Dr. Shahryar was awarded the Ontario Graduate Scholarship (OGS), President's Graduate Scholarship (PGS), NSERC's Japan Society for the Promotion of Science (JSPS) Fellowship, NSERC's Industrial R&D Fellowship (IRDF), NSERC's Visiting Fellowship in Canadian Government Laboratories (VF), and the Canadian Institute of Health Research (CIHR) Fellowship for two times. He was a CIHR research fellow for two years at Medial Imaging Department at Robarts Research Institute, Canada. During the PhD program, he published six journal papers, three book chapters, and 17 conference papers. Furthermore, one of his PhD works is a part of a patent which was registered by University of Waterloo.

Plenary Lecture 9

Advanced Methods for Text Retrieval

Professor Ioana Moisil
Co-author: Lucian Blaga
Department of Computer Science and Automatic Control
Hermann Oberth Faculty of Engineering
Lucian Blaga University of Sibiu
Blvd. Victoriei 10, 550024 Sibiu
ROMANIA
E-mail: ioana.moisil@ulbsibiu.ro

Abstract: Information retrieval (IR) is one of the most challenging fields of study. Today we are defining information retrieval as the interdisciplinary science of searching for documents, for information within documents and for documents' metadata in databases and on the World Wide Web. For many decades IR was concerned with finding the needed information from large collections of text documents. The explosive growth of the use of digital multimedia, from image and graphics to audio and video files over the Internet and wireless communications, or stored on DVDs and CD-ROMs, has determined the development of a specific sub-field of IR, i.e. multimedia information retrieval. In this lecture I will focus only on text retrieval methods. The retrieving unit is the document and documents from a collection are extracted to form the text data base. The documents are Web pages, if we are searching the Web. The retrieving process is simple but not at all trivial: a user is issuing a query; the retrieving system is then finding a set of documents relevant to the user's query; the selected documents are ranked by relevance scores. The process can be tuned manually or automatically. The most wide used format for the query is a list of keywords, but other formats can be used: Boolean queries, phrase queries, proximity queries, full document, and natural language questions. There are several aspects that turn the retrieving process from an apparent simple process into a very complex and challenging one. First, the tremendous success of the Web has transformed it in the most important information source, shadowing traditional and digital libraries. That means we have to retrieve information from a countable but almost infinite collection of documents. For example, the number of pages in Google's index is growing at an amazing rate - while it started with 26 million pages in 1998, it had last year a trillion of pages. So the first challenge is to use retrieval methods that lead to a rapid response. The second challenge is linked to relevance, and the concern to reduce information overload. We will refer these aspects all along the presentation.
In the first part of this lecture I will critically discuss the most used information retrieval models, from the ones based on set theory (standard and extended Boolean model, fuzzy retrieval model) to more recent ones: algebraic models (the vector space model – VSM and extensions: TVSM, latent semantic analysis, term discrimination, DSIR model). Some probabilistic models will be also presented.
The second part of the lecture will discuss relevance feedback and performance measures. In the third part the need of text and Web pages pre-processing will be emphasised.
Instead of conclusions we will discuss the impact on text retrieval of two innovative technologies: semantic Web and Web services and of the Web 2.0 paradigm.

Brief Biography of the Speaker: Ioana Moisil received the M.Sc. in Mathematics at the University of Bucharest, in 1971, the scientific grade in Statistical, Epidemiological and Operation Research Methods Applied in Public Health and Medicine at the Universite Libre de Bruxelles, in Belgium, in 1991 and the Ph.D. in Mathematics at the Romanian Academy in 1997. Work places: the National Institute for Research & Development in Informatics - I.C.I (1971-1986), Carol Davila Faculty of Medicine Bucharest – department of Biophysics, CCSSDM Center of the Ministry of Health. At present she is a full-time Professor and a Senior Researcher at the Department of Computer Science and Automatic Control – Faculty of Engineering at the "Lucian Blaga" University of Sibiu. She is the author/co-author of fourteen books and over 150 scientific papers. Her scientific interests include intelligent systems, healthcare telematics, web technologies, data-mining, e-learning, modelling and simulation, uncertainty management, human-computer interaction. Professor Moisil participated in several EU funded projects as project manager for the national partner (Telenurse ID ENTITY, MGT, PROPRACTITION, PRO-ACCESS), in Tempus projects and in national funded projects as research manager and software development coordinator (INFOSOC – eUNIV, AMTRANS – eCASTOR, INFOSOC - e-Scribe, INFOSOC – DANTE, e-EDU-Quality, eTransMobility, CNCSIS 2007-

code 33, Studies on multivariate interpolation, polinomial classifiers and applications, CNCSIS 2007 – cod 1502, Aspects concerning the psycho-cognitive abilities of artificial intelligent agents and applications in ITC based education). Current research is oriented on information retrieval, meta-heuristics, advanced classification methods. Ioana Moisil is a member of EARLI (European Association for Research in Learning and Instruction), she is Romanian representative in the IMIA SIG and EFMI WG5 Nursing Informatics, honorary member of the Bohemian Medical Association J.E.Purkyne of Bio-engineering and Medical Informatics, member of the ISCB – International Society for Clinical Biostatistics – Romanian National Group, of the Romanian Association of Engineers, member of the IITM- International Institute of Tele-Medicine and of the Romanian Society of Mathematics Sciences. She is vice-president of the Romanian Medical Informatics Society; vice-president of the HIT Foundation for Health Informatics and Telematics and a member of RoCHI-ACM. Professor Moisil is taking part in several international peer-review committees and conferences scientific boards.

Plenary Lecture 10

Computational Intelligence Techniques in Solving Power System Problems

Associate Professor Ismail Musirin
Centre of Electrical Power Engineering Studies (CEPES)
Faculty of Electrical Engineering
Universiti Teknologi MARA
Malaysia
E-mail: i_musirin@yahoo.co.uk

Abstract: This plenary lecture presents the application of computational intelligence techniques in solving power system problems. In power system, the transmission grid network is normally very large and bulky; therefore the on-line study is normally not recommended due to their complexity. In order to solve this, offline study is the most recommended technique; representing the system models into their mathematical relationship and solve them using any optimization techniques. Amongst the popular computational intelligence techniques are Genetic Algorithm (GA), Evolutionary Programming (EP), Artificial Immune System (AIS), Particle Swarm Optimization (PSO) and Ant Colony Optimization Technique (ACO). In this lecture, the applications of EP, AIS, PSO and ACO in solving various power system optimization problems will be addressed, such as; maximum loadability identification for power system load, reactive power planning schemes and economic power dispatch. In maximum loadability identification, the maximum permissible load is optimized for several selected load buses; which allows the power system operators to identify the weak and secure buses in the system. Reactive power planning is a scheme used to alleviate voltage limit in a system through voltage stability improvement technique and/or loss minimization. Implementations on reliability test systems revealed their feasibility for further implementation on practical systems. On the other hand, economic power dispatch is used to determine the amount of power to be dispatched by the generators within the acceptable economic constraints. Comparative studies of various optimization techniques highlighted the most suitable computational intelligence optimization techniques for a particular power system problem.

Brief Biography of the Speaker: Assoc. Prof. Dr. Ismail Musirin is currently the Chair, Centre of Electrical Power Engineering Studies (CEPES), Faculty of Electrical Engineering, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. He received Bachelor of Electrical Engineering (Hons) from University of Technology Malaysia (UTM) in 1990, MSc in Pulsed Power Technology from University of Strathclyde, United Kingdom and PhD in Electrical Engineering from Universiti Teknologi MARA (UiTM) in 2005. As of now, he has initiated the 1st International Power Engineering and Optimization Conference (PEOCO) held in June, 2007. The 2nd PEOCO2008 was organized in June 2008 and 3rd PEOCO will be organized in June 2009, where he is the organizing chair. He has reviewed numerous technical papers for publication in the IEEE transactions and conferences, IET journals, WSEAS transactions and conferences and several conferences and journals. He has published more than 100 technical papers in the international journals and conferences. His research interest includes computational intelligence, power system optimizations, voltage stability studies, loss minimizations, reactive power control schemes and computational mathematics.

Plenary Lecture 11

Semantic Approaches for Web Multimedia Processing and Communication

Assistant Professor Ashraf M. A. Ahmad
Department of Computer Graphics and Courtesy Department of Computer Science
Princess Sumya University for Technology
P. O. Box 1438 Amman 11941, Jordan
E-mails: ashrarf@csie.nctu.edu.tw , a.ahmad@psut.edu.jo

Abstract: The motivation for emerging the concept semantic web is due to the fact that search engines and text-based exploring are no longer adequate as these approaches involve an extensive information retrieval process. The deployed searching and retrieving descriptors are naturally subjective and their deployment is often restricted to the specific application domain for which the descriptors were configured. The new era of information technology imposes different kinds of requirements and challenges. Automatic extracted audiovisual features, as these features are more objective, domain-independent and more native to the audiovisual content are required. Therefore, this presentation is a detailed trail to introduce to the researchers, experts, students and practitioners very valuable references and guides to lead them through their exploration and researching the multimedia content and semantic web. The results of leading researchers from around the world are successfully collected in one concise presentation in very semantic manner.

This highly informative presentation includes three parts to construct a valuable reference resource for researchers, student and experts dealing with the emergence of integrated semantic multimedia field.

The presentation introduces the concept of semantic web and multimedia content analysis to the readers through a logical sequence from standards and hypothesis through system examples, presenting relevant tools and methods. In addition, this presentation addresses approaches applied to specific problem domains such as content search, indexing and retrieval.

The attendees may attain sufficient knowledge to start projects or researches related to the presentation theme from finding recent results and articles related to the active research area of integrating multimedia with semantic web technologies.

The semantic web technologies are elaborated and ontology representation has been emphasized. The presentation provides an excellent summary of the fundamental theory behind applying a knowledge engineering approach to vision problems. This summery iconize the concept of semantic web and multimedia content analysis. A definition of the fuzzy knowledge representation that can be used for realizing on multimedia content applications has been provided with comprehensive analysis.

The second part of presentation introduces the multimedia content analysis approaches and applications. In addition, some examples of methods applicable to multimedia content analysis are presented.

Multimedia content analysis is very diverse and concerns many other research fields at the same time. Multimedia content analysis has strong diversity issues, as it starts from low level features such as (colors, DCT coefficients, motion vectors, etc.) up to the very high and semantic level (Object, Events, Tracks, etc.). The second part includes topics on structure identification (e.g. shot detection for video sequences), and object-based video indexing. These conventional analysis methods are supplemented by results on semantic multimedia analysis, including development and use of knowledge models for automatic multimedia analysis.

The final part of the presentation discusses and describes example systems which current projects have been implemented, and include extensive results and real demonstrations. For example, real case scenarios like ECommerce medical applications and web services have been introduced. Natural language, speech and Image processing techniques and its application for multimedia indexing and contentbased retrieval have been elaborated with extensive examples and deployment methods.

Brief Biography of the Speaker: Ashraf Ahmad obtained his PhD degree in Computer Science and Engineering from National Chiao Tung University (NCTU) in Taiwan. He obtained his B.Sc. degree from Princess Sumya University for Technology (PSUT) in Jordan. Dr. Ahmad is currently an assistant professor at the department of computer Graphics in PSUT, Jordan. His interest area includes multimedia semantic features extraction, and analysis, multimedia retrieval, and multimedia communication. Prof. Ahmad has authored over 50 scientific publications including journal papers, conference

papers and book chapters. In addition, Dr. Ahmad has several US and international patents in his field of expertise. He serves in program committee for several international conferences. He is also a reviewer and referee for several conferences and journals. His work has been published and presented at various international conferences.

Dr. Ahmad has been listed in Who's Who in the World for the year 2006 and Who's Who in Asia for the year 2007. In addition, He has been elected as one of the 2000 Outstanding Intellectuals of the 21st Century for the year 2006 for his outstanding contribution in field of Video Processing and Communications. Ashraf Ahmad has been chosen as one of the recipients of Leading Scientist award in the year 2006. In 2008 Dr. Ahmad and his team won the first place in both Jordan and Middle East Level in the world wide international competition Imagine Cup for their novel project in Air Pollution Detection using video analysis. Again Dr. Ahmad and his team won the first place in METS'08 competition for their project in Bluetooth Mobile Application field.

Authors Index

Abdullah, N. R. 254
Abdul-Rahman, T. K. 176, 224, 236,
Abdul-Rahman, T. K. 242, 248, 254
Adela, B. 325, 331
Ahmed, M. U. 378
Ahn, D. K. 337
Aminuddin, N. 224, 236
Apostol, E. 35
Arabzadeh, M. 260
Areerak, K. 314
Asadullah, S. 308
Attakitmongcol, K. 435, 390
Ay, D. 465
Balicki, J. 319
Baritz, M. 41, 518,
Baritz, M. 523, 527
Begum, S. 378
Beitollahzadeh, S. 159
Bezerra, M. A. 230
Bologa, A.R. 441
Borzan, C. 513
Bulucea, C. A. 202
Burtea, V. 41
Buzatu, C. 139, 295
Cagnazzo, L. 89
Caprita, H. V. 49
Caramihai, S. I. 453
Carstea, C G. 402, 407
Chalabi, N. 301
Chen, H. 148, 165
Cil, I. 465
Constantinescu, R. 343
Corcau, J. I. 208
Cotoros, D. 518, 527
Cristea, L. 41, 518,
Cristea, L. 527, 523
Dahabiah, A. 212, 218
Damian, D. 402, 407
David, N. 402, 407
de Souza, J. A. 230
Domnariu, C. 55, 513
Duicu, S. 139
Dumitrache, I. 453
Ekhtiyari, E. 159
El Alami, N. E 181
El-Bakry, H. M. 95
Elenkov, A. 134
Farzad, V. 260
Filho, M. D. 230
Floarea, M. 513
Florea, A. 348
Fota, A. 139, 295
Fujita, H. 79
Funk, P. 378
Gardesh, H. 501
Gaviano, M. 279
Gegov, A. 116, 122
Gheorghe, C. M. 495
Golemanov, T. 417, 423
Golemanova, E. 417, 423
Grigorie, T. L. 208
Guedira, S. 181
Gulevskiy, Y. 191
Hakura, J. 79
Hamdi-Cherif, A. 447
Hernandez, E. 89
Homma, N. 396
Hung, C. P. 59
Iliev, P. 111
Ion, L. 325, 331
Ionescu, A. 67
Ionescu, E. 495
Ionescu, S. A. 67, 495
Ishibashi, T. 396
Ismaili, P. B. 429
Javadi, S. 260
Johari, D. 224, 236
Jovanovic, R. 490
Kadivar, P. 260
Kalil, M. R. 248
Kohli, M. 471
Kratchanov, K. 417, 423
Kumar, M. 197
Kumsawat, P. 390, 435
Kurematsu, M. 79
Kwon, S. M. 337
Leasu, F. 513
Lee, S. H. 337
Lepadatescu, B. 139, 295
Liu, Y 288
Lu, J. 73
Lukas, A. 354
Mahanand, B. S. 197
Malikov, A. 191
Malikova, E. 191
Manescu, M. 518
Manole, V. 331
Manolea, G. 202
Mastorakis, N. 95
Mayero, M. 477
Mihailov, A. 143
Mihu, I. Z. 49
Minca, D. 513
Mirjalili, S. A. 159
Miyajima, H 372
Mohammed, C. K. 447
Mohd Kamal, M. F. 242
Mohsen Zade, M. 501
Moisil, I. 55, 523
Monsuez, B. 477
Morgera, A. 271, 279
Moussa, N. 266
Muntean, M. 441
Muresan, C 366
Murgoci, C. S. 495
Musirin, I. 176, 224, 236,
Musirin, I. 242, 248, 254
Nalini, N. 360
Narongrit, T. 314
Nastase, F. 343
Ng, K. 384
Olteanu, A. L. 29
Oppacher, F. 354
Othman, M. 248, 254
Pakseresht, M. 501
Panian, Z. 170
Parkhomenko, D. 191
Patrascu, A. 202
Patrascu, L. 402, 407
Patrascu, N. 402, 407
Pein, R. P. 73
Petrov, G. 111
Petrov, N. 116
Popescu, M. C. 202
Puentes, J. 212, 218
Pushpalatha, M. P. 360
Radovici, A. 35
Rafiee, A. 186
Rahnamayan, S. 531
Ratiu, I. G. 402, 407
Repanovici, A. 518, 523
Rezaei, E. 154
Rogozea, L. 41, 55, 507,
Rogozea, L. 513, 518, 527
Roosta, A. R. 186
Ruberto, C. D. 271, 279
Sabau, G. 441
Sait, S. M. 308
Sakai, M. 396
Salimi, A. 186
Sawai, N. 79
Schnitman, L. 230
Scorta, I. 348, 441

Seyyedi, M. A.	501	Su, H. J.	59	Vallee, N.	477
Shigei, N.	372	Sug, H.	413	Vasilica, O. S.	325
Shihab, K.	301	Sulaiman, S.	176	Vedrine, F.	477
Shimoyama, S.	396	Tabakova, B.	128	Vlad, D.	331
Silva, E. A.	459	Taticchi, P.	89	Voicu, A. R.	67
Solaiman, B.	212, 218	Toma, A.	343	Volovici, D.	46
Song, J.	337	Tonelli, F.	89	Volovici, M. R.	46
Sotthithaworn, C.	435	Topalova, I.	143	Wang, G.	531
Soulhi, A.	181	Toussaint, G.	288	Wu, N.	459
Sqalli, M. H.	308	Tuba, M.	484, 490	Xiong, N.	378
Srikaew, A.	314, 435, 390	Turcanu, M.	523	Yang, S.	59
Sroisuwan, N.	435	Turkan, Y.	465	Yordanova, S.	103, 128
Stanescu, A.	453	Tzokev, A.	143	Yoshizawa, M.	396
Stav, J.	73	Tzvetkov, P.	111		
Stoenescu, E.	208	Ura, M.	73		