



Editor

Valeri Mladenov



Associate Editors

Elias Giacoumidis

Jinlong Wei

Recent Advances on Systems, Signals, Control, Communications and Computers

- **Proceedings of the 13th International Conference on Data Networks, Communications, Computers (DNCOCO '15)**
- **Proceedings of the 10th International Conference on Dynamical Systems and Control (CONTROL '15)**
- **Proceedings of the 8th European Computing Conference (ECC '15)**
- **Proceedings of the 7th International Conference on Sensors and Signals (SENSIG '15)**

Budapest, Hungary, December 12-14, 2015



RECENT ADVANCES on SYSTEMS, SIGNALS, CONTROL, COMMUNICATIONS and COMPUTERS

**Proceedings of the 13th International Conference on Data Networks,
Communications, Computers (DNCOCO '15)**
**Proceedings of the 10th International Conference on Dynamical Systems and
Control (CONTROL '15)**
Proceedings of the 8th European Computing Conference (ECC '15)
**Proceedings of the 7th International Conference on Sensors and Signals
(SENSIG '15)**

**Budapest, Hungary
December 12-14, 2015**

RECENT ADVANCES on SYSTEMS, SIGNALS, CONTROL, COMMUNICATIONS and COMPUTERS

**Proceedings of the 13th International Conference on Data Networks,
Communications, Computers (DNCOCO '15)**

**Proceedings of the 10th International Conference on Dynamical Systems and
Control (CONTROL '15)**

Proceedings of the 8th European Computing Conference (ECC '15)

**Proceedings of the 7th International Conference on Sensors and Signals
(SENSIG '15)**

**Budapest, Hungary
December 12-14, 2015**

Published by WSEAS Press

www.wseas.org

Copyright © 2015, by WSEAS Press

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

All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

ISSN: 1790-5117

ISBN: 978-1-61804-355-9

RECENT ADVANCES on SYSTEMS, SIGNALS, CONTROL, COMMUNICATIONS and COMPUTERS

**Proceedings of the 13th International Conference on Data Networks,
Communications, Computers (DNCOCO '15)**
**Proceedings of the 10th International Conference on Dynamical Systems and
Control (CONTROL '15)**
Proceedings of the 8th European Computing Conference (ECC '15)
**Proceedings of the 7th International Conference on Sensors and Signals
(SENSIG '15)**

**Budapest, Hungary
December 12-14, 2015**

Editor:

Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria

Associate Editors:

Dr. Elias Giacomidis, University of Sydney, Australia

Dr. Jinlong Wei, ADVA Optical Networking SE, Germany

Committee Members-Reviewers:

Haziq Jeelani

Valentina E. Balas

Yu Zhang

YuLung Wu

Ankit Patel

Nikos Loukeris

Panagiotis Gioannis

Md. Jakir Hossen

Hime Aguiar

Giovanni Aiello

Seong Baeg Kim

Satish Kumar Duraiswamy

Eleonora Catsigeras

JainShing Wu

Montri Phothisonothai

Kevin Kam Fung Yuen

Aw Yoke Cheng

Manuela Panoiu

Eleazar Jimenez Serrano

Onintra Poobrasert

Elena Bautu

Josip Music

Kyunghee Lee

Mueen Uddin Awan

Paresh Rathod

Pavel Varacha

Sorinel Oprisan

Gabriel Badescu

Constantin Popescu

Petr Hajek

Alvaro Santos

Poom Kumam

Frangiskos Topalis

Ajay Poddar

Mariya Aleksandrova

Chandrasekaran Subramaniam

Chi Chieh-Tsung

Betül Kan

Payam Porkar

Bazil Taha Ahmed

Sandra Sendra

Ozlem Coskun

Neha Srivastava

Mustafa Yagimli

Igor Astrov

Jerzy Garus

Tamer Khatib

Mohamed Khater

Nikhil Raj

Ioan Susnea

Masaji Tanaka

Inacio Fonseca

Catalin Ionut Silvestru

Yilun Shang

Anastasios Salis

Radha Gupta

Dalibor Bialek

Morale Terry

Sorin Ioan Deaconu

Farhad Mehran

Kei Eguchi

Mohammad Firoj Mithani

Essam Khalifa

Ali Elnaiem

Mohamed Hashem

Mostafa Aref

Taha Elarif

El-Sayed El-Horbaty

Taymoor M. Nazmy

Mohamed. F. Tolba

Ana-Cornelia Badea

José Metrôlho

Dzenana Donko

S. Sarala Subramani

Klimis Ntalianis

Hani Mahdi

Kostantinos Kalovrektis

Preface

This year the 13th International Conference on Data Networks, Communications, Computers (DNCOCO '15), the 10th International Conference on Dynamical Systems and Control (CONTROL '15), the 8th European Computing Conference (ECC '15) and the 7th International Conference on Sensors and Signals (SENSIG '15) were held in Budapest, Hungary, December 12-14, 2015. The conferences provided a platform to discuss data networks, communications, computers, programming languages, operating systems, dynamical systems, control, network architecture, wireless networks, information security, sensors, signal processing etc. with participants from all over the world, both from academia and from industry.

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

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

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

The Editors

Table of Contents

<u>Plenary Lecture 1: Energy Efficiency Approach: From Wireless Networks to Potential Applications</u>	13
<i>Zoran Bojkovic</i>	
<u>Plenary Lecture 2: Some Applications of Fuzzy Logic in the Selection of Alternatives Considering Multiple Parameters</u>	14
<i>Amaury A. Caballero</i>	
<u>Plenary Lecture 3: Interactive Driving Simulators – Modern Tools for Training and Research and Development in the Area of the Human–Machine Interaction (HMI) in Transport</u>	15
<i>Petr Bouchner</i>	
<u>Plenary Lecture 4: Hierarchical Fuzzy Petri Nets Approach of Simultaneous Task Assignment for Autonomous Mobile Robots</u>	16
<i>Gabriela Tont</i>	
<u>Plenary Lecture 5: Data Compression Today: A Journey through Better Understanding Data</u>	17
<i>Bruno Carpentieri</i>	
<u>Information Technology Infrastructure Management - Understanding Human Element</u>	19
<i>Seppo Sirkemaa</i>	
<u>Performance Analysis of Network Coding-Based Cooperative ARQ with Carry-Over of Backoff Counter Freezing After Collision</u>	23
<i>Katsumi Sakakibara, Jumpei Taketsugu</i>	
<u>Analytical and Numerical Investigations of Piece-Wise Smooth Tuned Mass Dampers</u>	33
<i>Bernardino Chiaia, Luca Placidi, Livio Conti</i>	
<u>Optical-Phase Conjugation Nonlinearity Compensation in Flexi-Grid Optical Networks</u>	39
<i>C. Sanchez, M. McCarthy, A. D. Ellis, P. Wright, A. Lord</i>	
<u>Development of Mixed Screen Content Coding Technology: SCC-HEVC Extensions Framework</u>	44
<i>Dragorad Milovanovic, Zoran Bojkovic</i>	
<u>A Bound on the Number of Middle-Stage Crossbars in f-Cast Rearrangeable Clos Networks</u>	51
<i>Marek Kubale, Pawel Obszarski</i>	
<u>Reliability Problems in Prediction Diagnostics for Uncertain Systems</u>	55
<i>Mirko Novak, Petr Bouchner, Emil Pelikan, Miroslav Svitek, Zdenek Votruba</i>	
<u>LSP Placement in an MPLS-TP Mesh Network with Shared Mesh Protection Mechanism</u>	65
<i>Claudio Roberto Ferreira Costa, Wagner Luiz Zucchi</i>	
<u>Visual Investigation of Driver Behavior for Fatigue Detection – Driving Simulator Experiments</u>	72
<i>Alina Mashko, Petr Bouchner</i>	

<u>Hierarchical Fuzzy Petri Nets Approach of Simultaneous Task Assignment for Autonomous Mobile Robots</u>	77
<i>Gabriela Tont</i>	
<u>Concept for Development of Large-Scale Applications through Configuration Frameworks</u>	83
<i>Petr Vobornik</i>	
<u>Research of Influence of Vibration Impact of the Basis in the Micromechanical Gyroscope</u>	91
<i>Galina Vavilova, Olga Galtseva, Inna Plotnikova</i>	
<u>Extend IT Services in Process Control Domain for Onshore Oilfields</u>	96
<i>Nicoleta-Marilena Matei, Dan Popescu</i>	
<u>Multispectral Sensory Head Calibration for Reconnaissance Robotics</u>	101
<i>Petra Kocmanova, Ludek Zalud, Lukas Kopecny</i>	
<u>Modification of Routing Protocols of the Wireless Sensor Network for Increasing the Network Life Expectancy</u>	110
<i>Aleksejs Jurenoks, Leonids Novickis</i>	
<u>A Lossless Invisible Watermarking Scheme for Hyperspectral Images</u>	119
<i>Raffaele Pizzolante, Bruno Carpentieri</i>	
<u>Influence of Systems for Measurement Using Computers to Popularity of Subject Physics at Elementary School – Some Results</u>	124
<i>Radek Nemeč, Stepan Hubalovsky</i>	
<u>Hall Effect in Multi-Sensors Systems for Mobile Robot Localization in Uneven Terrain</u>	131
<i>Mihu Dan Tont, Gabriela Tont, Dan George Tont</i>	
<u>On the Road to Energy Efficient 5G Mobile Networks</u>	137
<i>Zoran Bojkovic, Miodrag Bakmaz, Bojan Bakmaz</i>	
<u>High Speed Brightness Amplifiers for Diagnostics of Fast Processes Obscured by Intense Background Radiation</u>	141
<i>Gennadii Evtushenko, Maxim Trigub, Stanislav Torgaev, Tatyana Evtushenko</i>	
<u>Aggressive Behavior and Stress while Driving</u>	149
<i>Mirko Novak, Petr Bouchner, Stanislav Novotny, Zdenek Barnet</i>	
<u>Binary Consensus-Based Decentralized Algorithm for Event Detection in Large Scale Monitoring Systems</u>	155
<i>Cristian Dragana, Grigore Stamatescu, Dan Popescu</i>	
<u>Low Complexity Binary Signed Digit Multiplier for Modular Multiplication</u>	161
<i>Se-Hyu Choi, Keon-Jik Lee</i>	
<u>Tool and Mechanisms for Efficient Transfer of Data in Cloud Client-Server Applications</u>	166
<i>Petr Vobornik</i>	

<u>Power Balance Interpretation in Sinusoidal Regime of Capacitively-Loaded Gyrator</u>	172
<i>Dan George Tont, Gabriela Tont</i>	
<u>The Methods of Decreasing the Influencing Factors on the Results of Cable Insulation Control Carried out with the Complex Methods</u>	178
<i>N. S. Starikova, V. V. Redko</i>	
<u>Capacity Limits of Core Optical Transmission Technologies</u>	182
<i>Elias Giacomidis, Ivan Aldaya, Mohammad Ghanbarisabagh, Nick J. Doran, Jinlong Wei</i>	
<u>Flooded Areas Detection Based on LBP from UAV Images</u>	186
<i>Andrada Livia Sumalan, Dan Popescu, Loretta Ichim</i>	
<u>The Control System of the PV Concentrator System Cooled by a Heat Sink</u>	192
<i>Alena Okhorzina, Alexey Yurchenko, Norbert Bernhard</i>	
<u>Evaluation of Acoustic Data Communication for Fish Farm Monitoring</u>	195
<i>Yoshiaki Taniguchi</i>	
<u>Social Aspect of Modern Communications: Internet Addiction</u>	200
<i>Petra Kalibova, Eva Milkova</i>	
<u>2D Wedge Filter Design and Applications in Oriented Line Extraction</u>	205
<i>Radu Matei</i>	
<u>New Acoustic Sensors for Breathing Investigations</u>	211
<i>Semyon Shkundin, Evgeny Kalashnikov, Sergei Bouyanov, Slava Koryakin</i>	
<u>A Model Reference Adaptive Controller Performance of an Aircraft Roll Attitude Control System</u>	217
<i>Hakan Korul, Demet Canpolat Tosun, Yasemin Isik</i>	
<u>Watermarking in Regional Medical Imaging</u>	222
<i>Michal Javornik, Otto Dostal, Ales Rocek</i>	
<u>An Aluminum-Nickel Micro-Heater-Sensor Device with PI-Compensation</u>	227
<i>P. Deekla, N. Chomnawang, R. Phathanakun, S. Sujitjorn</i>	
<u>Two Electrode-Based SOA Intensity Modulators for Adaptively Modulated Optical OFDM Signals</u>	232
<i>Mohamad Hamze, Ali Hamie, Ali Mokdad, Souad Mamo, Ammar Sharaiha, Pascal Morel, Mikael Guegan, Elias Giacomidis, Jiangming Tang</i>	
<u>Impact of Mobility on the Performance of Cognitive Radio Mobile Cellular Networks with Real-Time Traffic</u>	236
<i>Jose Serrano-Chavez, Genaro Hernandez-Valdez, Felipe A. Cruz-Perez, Sandra L. Castellanos-Lopez, Edgar A. Andrade-Gonzalez, Mario Reyes-Ayala, Jose R. Miranda-Tello</i>	
<u>Downlink MAP Decoding for the WiMAX System Identification</u>	243
<i>Nouha Alyaoui, Abdennaceur Kachouri, Mounir Samet</i>	

<u>The Methodology of Maximum Illumination PV Control System</u>	249
<i>Maria Kitaeva, Alexey Yurchenko, Alena Okhorzina</i>	
<u>Exploring IEC 61499 for a Distributed Software Architecture in an Onshore Oil Field</u>	255
<i>Lucian-Sorin Dobrescu, Dan Popescu, Oana Chenaru</i>	
<u>Performance Analysis on Downstream Link of OFDM-PON Working in IQ Modulation-Heterodyne Detection Scheme</u>	262
<i>Mingzhi Mao, Rongrong Chen, Caixia Kuang, Rujian Lin</i>	
<u>Device CAP-10 for In-Process Measurement of the Single-Core Wire Capacitance per Unit Length</u>	272
<i>Aleksandr Goldsteyn, Galina Vavilova</i>	
<u>Selecting Suitable Sensor on Building an Electronic Nose</u>	278
<i>Bilge Han Tozlu, H. Ibrahim Okumus, Cemaleddin Simsek</i>	
<u>Delay Analysis for Decentralized Passive Optical Network Intelligent Algorithm</u>	281
<i>Sajaa Kh. Sadon, Thavamaran Kanesan, Hizamel M. Hizan, Romli Mohamed</i>	
<u>Rectangular Microstrip Antenna for GPS Receiver</u>	287
<i>Mario Reyes-Ayala, Edgar Alejandro Andrade-Gonzalez, Jose Raul Miranda-Tello</i>	
<u>A Simple High Gain Observer for the Wind Energy System Based on the Doubly Fed Induction Generator</u>	290
<i>Rachid Lajouad, Fatima Zahra Chaoui, Abderrahime El Fadili</i>	
<u>Identification of Control Moment Gyro Faults on Noisy Sensor Data</u>	298
<i>Sang-Eun Beck, Ji-Chul Kim, Hwa-Suk Oh</i>	
<u>Semi-Structured Interviews with Teachers of Physics to Determine the Course of the Lessons of Physics of Primary Schools in the Hradec Kralove Region Czech Republic</u>	304
<i>Radek Nemeč, Stepan Hubalovsky</i>	
<u>2-D ESPRIT Method and Zernike Moments Based on CBIR</u>	308
<i>Chawki Youness, Khalid El Asnaoui, Ouanan Mohammed, Aksasse Brahim</i>	
<u>Simulation and Control of Flexible Structure</u>	314
<i>Mustafa Tinkir</i>	
<u>Adaptive Traffic Signal Control Using Backbone Routing in VANET</u>	319
<i>V. Vijay, R. Kalpana, N. Moganarangan, D. Vinodh, R. Sriram, K. Gagan</i>	
<u>Small Antennas for New Wireless Communications Systems</u>	328
<i>E. A. Andrade-Gonzalez, M. Reyes-Ayala, J. R. Miranda-Tello, G. Hernandez-Valdez</i>	
<u>Authors Index</u>	332

Plenary Lecture 1

Energy Efficiency Approach: From Wireless Networks to Potential Applications



Professor Zoran Bojkovic

Full Professor of Electrical Engineering

University of Belgrade

Serbia

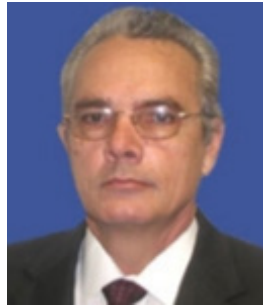
E-mail: z.bojkovic@yahoo.com

Abstract: In order to provide sufficient and low-cost energy to sustain economic growth and living standards, innovation and development of alternative energy sources are required. Over the past decade, the demand for high-rate multimedia wireless communication services has increased dramatically with the popularity of mobile devices. The need for media rich input/output computation and communication forces mobile users to charge their devices more often. On the other side, service providers have been adding more and more base stations (BSs) to meet a higher service demand. A large portion of the service providers' operational costs is due to energy consumption of the wireless systems for both mobile users and service providers. This Plenary Lecture deals with energy efficiency approach from wireless networks to potential applications toward 5G systems. Recently, 5G cellular networks are becoming the most active research area in wireless communications. The 5G mobile network is required to have tremendous spectral efficiency (SE) and energy efficiency (EE) improvement simultaneously. As a result, SE, EE, and cost efficiency have been used as three obligatory 5G evaluation metrics. In general, joint energy and communication cooperation is more complex than energy or communication cooperation only. Joint energy and communication cooperation can maximally save cost by applying both energy cooperation on the supply side and communication operation on the demand side. For the realization, the BSs should share the energy information by using the two-way information flow supported by the smart grid. The communication information is exchanged through the back haul connections. As for 5G networks, the primary goal is to satisfy a variety of users needs in a more energy efficient manner. The question often arises will be where the energy can be further saved and what available information in the network can be exploited. Starting with energy saving approach, cellular networks with energy and communication cooperation are pointed out. Next, recent advances in energy efficient networks and their application in a new generation of mobile communication- the fifth generation (5G) are presented and discussed. Finally, the corresponding challenges are emphasized.

Brief Biography of the Speaker: Prof. Dr. Zoran Bojkovic from the University of Belgrade, Serbia is the permanent Visiting Professor of the University of Texas at Arlington, UTA, TX, USA, EE Department, Multimedia System Lab. As Assistant Professor, he was a visiting researcher at Stanford University, Stanford, CA, USA, Information System Lab., hosted by Prof. Robert M. Gray. Until now, he was a visiting professor at more than 20 Universities worldwide and taught a number of courses in the field of electrical technology, digital signal processing, communication and computer networks, wire/wireless multimedia communications. Prof. Zoran Bojkovic is the co-author of 7 International Books and 20 Chapters of the International Books, published by Prentice-Hall, Wiley, CRC Press, Taylor and Francis Group, Springer, Elsevier, etc. Some of the Books have been adopted in different countries and have been translated in China, India, Canada, Singapore. Also, he is co-editor in 75 International Books and Conference Proceedings. He served and is still serving as Editor-in-Chief, Associate Editor, Guest Editor, Editorial Board Member and Reviewer in International Journals. He was and still is General Chair, Co-chair TPC Member at well-known conferences worldwide. He has published more than 450 papers in peer-reviewed journals and conference proceedings. Prof. Zoran Bojkovic has conducted many Keynote/Plenary/Invited Lectures, Workshops/Tutorials, Seminars. As a result of numerous international collaboration, he participated in many international scientific and industrial projects. He is a Senior Member of IEEE, Member of EURASIP, IASTED, SERC Korea, expert in AMSET, expert in European Project services, full member of Engineering Academy of Serbia, member of Serbian Scientific Society.

Plenary Lecture 2

Some Applications of Fuzzy Logic in the Selection of Alternatives Considering Multiple Parameters



Professor Amaury A. Caballero
Florida International University
Department of Electrical and Computer Engineering
USA
E-mail: caballer@fiu.edu

Abstract: In any decision-making process, it is necessary to evaluate different parameters and disclose the effect they have in the solution in order to optimize it. If the criteria are mathematically quantifiable, a mathematical model may be created for the evaluation process. The application of fuzzy logic is ideal for the solution of this type of problem. There are several common factors when using this method in the optimization of any task. Among them, the characteristics of the membership functions and the criteria used in the optimization as well as the selection of the experts are of fundamental importance. Fuzzy logic is not limited to a specific field of knowledge or industry. It can be applied wherever it is necessary to find the best solution to a problem based on different measurable parameters that somehow impact the result. In this lecture several examples are presented in order to clarify concepts such as the vertical handoff target selection in a heterogeneous wireless network; selection of the best contractor for doing a construction project during a bidding process, and the selection, from a security standpoint, of the best public transportation agency.

Brief Biography of the Speaker: Amaury A. Caballero obtained his Bachelor Degree in Electrical Engineering from the University of Havana, Cuba, earned his Ph.D. in Technical Cybernetics from the Energy Institute of Moscow, Russia, and his Professional Engineer License from the state of Florida, USA. He taught and did research at the Higher Polytechnic Institute of Havana, where he obtained the title of Professor and directed research in the areas of Automatic Control and Robotics. He was also a member of the Higher Scientific Council of the Cuban Academy of Sciences and received awards recognizing his work from the Cuban Ministry of Higher Education and the Technical University of Brno, in Czech Republic, where he also participated in a graduate study and in researches of robotics in conjunction with faculty members. He has been also invited to give presentations about fuzzy logic at the "Universidad de Pamplona" in Colombia, the "Universidad Catolica de Santa Maria", and the "Universidad Autonoma" in Peru, the "Universidad Tecnologica Centroamericana" in Honduras, and the "Universidad Autonoma Estatal del Estado de Hidalgo", in Mexico, where he also imparted a graduate course in fuzzy logic. Dr. Caballero has published two books in the area of automatic control and obtained five certificates of invention in the same area. He also has published research reports, journals papers and proceedings in scientific conferences, totaling over 100 publications. Presently, he is a Senior Lecturer at Florida International University, where he has taught nine electrical engineering undergraduate courses and one graduate course in fuzzy logic, in the department of Electrical and Computer Engineering. Also he has conducted in-depth research in the areas of automation applied to construction management, and in the use of rough sets and fuzzy logic for object discrimination in databases, among other applications.

Plenary Lecture 3

Interactive Driving Simulators – Modern Tools for Training and Research and Development in the Area of the Human–Machine Interaction (HMI) in Transport



Professor Petr Bouchner

Head of Department of Vehicles at Faculty of Transportation Sciences
Driving Simulation Research Group
Czech Technical University in Prague
Czech Republic
E-mail: bouchner@lss.fd.cvut.cz

Abstract: From a very beginning of history of modern transport it has been necessary to solve problems of safety and reliability of transporting vehicles and its operation. The source of failures have significantly changed during time. As the vehicles and their control systems in early phases of their evolution were generally unreliable and most of the focus had to be set on solving technical and technological problems - meanwhile the problem of the human operator himself was mainly narrowed to learning how to operate the vehicle and manipulate properly its control systems – in second half of 20's century the situation started to turn around. With the sophisticated design, construction and production technologies, it started to be seen that the focus has to be set to the human operator and HMI as the weakest part of this system. This covers not only perfect training in operation but also deep understanding of links and functions of a complex system of HMI and interfaces between them. Problems of reliability and safety of interaction between the human operator (driver) and him/her controlled artificial system (machine, vehicle) become crucial for transport safety.

The presentation shows and explains main principles of the research tools – the advanced interactive vehicle simulators, which are continuously being developed by the Driving Simulation Research Group at Czech Tech Univ. It encompasses passenger cars, two-wheelers, trucks, rail engines and others. This field of R&D deals with simulation technology but also scenario and experiment design and mainly measuring tools and methods, which could extract useful knowledge from measured data. An indisputable role in this area is played by so called psychophysiological measures. The lecture introduces problems of the HMI research field as well as problems of user interfaces in systemic point of view. Beside those general approaches, the lecture introduces in more detail main research focus of our institute - ergonomics and human factors in vehicle control. The lecture is based on results and examples from 15 years of research effort in this area that will be shown in pictures and videos.

Brief Biography of the Speaker: Academic career: 2003 - Master Degree at CTU Prague (Faculty of Electro-engineering), specialization in computer engineering, 2007 - Doctoral Degree at CTU Prague (Faculty of Transportation Sciences) "Driving simulators for HIM research", 2011 degree of associate prof. (doc.) at CTU Prague. Since 2003 researcher and university teacher, since 2007 Head of Driving Simulation Research Group, since 2008 deputy head of Laboratory of Systems Reliability of FTS,CTU and Institute of Informatics of Academy of Sciences of Czech Republic, since 2011 head of Department of Vehicles at FTS CTU in Prague, since 2013 member of the faculty Scientific Board.

Scientific activities: research activities in interactive and driving simulator construction and development, HMI in vehicles, human factors in transportation, measurements and analysis of complex data, implementation of virtual reality tools into the experiments, design of experiments and their analysis, member of editorial board of scientific journal Neural Network World and scientific journal Advances in Transportation Studies.

Author and coauthor of several tens of papers, chapters in journals, book chapters, books, research report on interactive simulators, human factors in transportation, ergonomics, driver's attention and fatigue. Member of expert groups of PIARC, ESoP by European Committee, Czech National Committee for Norms, member of Czech Board for Cosmic Technologies. Main solver (responsible) of several national scientific and applied research projects (grants).

Plenary Lecture 4

Hierarchical Fuzzy Petri Nets Approach of Simultaneous Task Assignment for Autonomous Mobile Robots



Professor Gabriela Tont

Department of Control Systems Engineering and Management
Faculty of Electrical Engineering and Information Technology
University of Oradea
ROMANIA
E-mail: gtont@uoradea.ro

Abstract: Task assignment processes and its control implying reasoning about objects and resources and their changing states are dominated by discrete or stochastic-event dynamics or both. Estimating the components position of the mobile robot provided by sensor generates unknown, hidden variables which will be model by the means of probabilistic inference taking into account incomplete and uncertain information. The modeling technique proposed in this paper, managing the uncertainty, vagueness and imprecision, bridges the aspects of Petri net theory, as a tool for the representation dynamic discrete event systems, with efficiency of fuzzy rule based reasoning by means of Hierarchical Fuzzy Petri Nets. A case study regarding a reasoning mechanism and an explanation of the reasoning process through task assignment in mobile robot system is explored using Bayesian belief network.

Brief Biography of the Speaker: Graduated "Politehnica" Institute of Bucharest and defined her professional training by earning Ph. D degree in Electrical Engineering at Technical University Cluj Napoca.

Caring out research and teaching projects in reliability engineering and management is, at present, professor of the Faculty of Electrical Engineering and Information Technology, University of Oradea.

Recent research conducted includes reliability analysis and data modeling in dynamical, non-linear systems, simulation modeling for risk assessment in context-aware computing and intelligent e-learning technologies.

Certified external quality auditor, has an extensive experience in strategic total quality management applied in manufacturing processes and quality system improvements with six sigma initiatives, optimizing TQM (zero defects, six sigma), quality planning (QFD).

Participated in several international and national projects as director, scientific manager or member.

In the fields above she has authored and/or co-authored 10 books and 9 chapters in books, 31 papers in editor conference proceedings; 68 journal papers, 110 conference papers.

Member in Editorial Boards of 8 journals, delivered 18 plenary/keynote lectures.

Reviewer for WSEAS conferences and WSEAS Transactions journals.

Actively participated at international and national conferences, in 16 was a member of scientific and/or organizing committees of conferences.

Plenary Lecture 5

Data Compression Today: A Journey through Better Understanding Data



Professor Bruno Carpentieri
Department of Computer Science
University of Salerno
ITALY
E-mail: bc@dia.unisa.it

Abstract: Digital data compression is aimed today by the economic need to save bandwidth in communication. As recent researches have shown, data compression, clustering, data classification and learning are all facets of the same multidimensional coin and data compression is strictly bound to efficient learning. In this talk we will review the current state of the art in the field and we will exploit the relationship between data compression and the knowledge that can be acquired through the compression process.

Brief Biography of the Speaker: Bruno Carpentieri received the “Laurea” degree in Computer Science from the University of Salerno, Salerno, Italy, and the M.A. and Ph.D. degrees in Computer Science from the Brandeis University, Waltham, MA, U.S.A.

Since 1991, he has been first Assistant Professor and then Associate Professor of Computer Science at the University of Salerno (Italy). His research interests include lossless and lossy image compression, video compression and motion estimation, information hiding. He has been for many years Associate editor of the journal IEEE Trans. on Image Processing. He was chair and organizer of the International Conference on Data Compression, Communication and Processing 2011, co-chair of the International Conference on Compression and Complexity of Sequences, and, for many years, program committee member of the IEEE Data Compression Conference. He has been responsible for various European Commission contracts regarding image and video compression and digital movies.