Editor
Sumanth Yenduri

ADVANCES IN COMPUTER SCIENCE

Proceedings of the 6th WSEAS European Computing Conference (ECC '12)

Prague, Czech Republic, September 24-26, 2012

Recent Advances in Computer Engineering Series | 5

ADVANCES IN COMPUTER SCIENCE

ADVANCES in COMPUTER SCIENCE

Proceedings of the 6th WSEAS European Computing Conference (ECC '12)

Prague, Czech Republic
September 24-26, 2012

Recent Advances in Computer Engineering Series | 5

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5109
ISBN: 978-1-61804-126-5

ADVANCES in COMPUTER SCIENCE

Proceedings of the 6th WSEAS European Computing Conference (ECC '12)

Prague, Czech Republic
September 24-26, 2012

Published by WSEAS Press
www.wseas.org

Copyright © 2012, by WSEAS Press

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

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

ISSN: 1790-5109
ISBN: 978-1-61804-126-5

World Scientific and Engineering Academy and Society

ADVANCES in COMPUTER SCIENCE

Proceedings of the 6th WSEAS European Computing Conference (ECC '12)

Prague, Czech Republic
September 24-26, 2012

Editor:
Prof. Sumanth Yenduri, The University of Southern Mississippi, USA.

International Program Committee Members:

Matteo Palai
Poom Kumam
Cornelia Gyorodi
Kandarpa Kumarsarma
Menaka Sivakumar
Pavelvaracha
Nagaraj S.V.
Slabyantonin Slaby
Claudia-Georgeta Carstea
George Mavrommatis
Larisa Dragolea
Sergio Lopes
Dzenana Donko
John Antonopoulos
José Metrôlho
Mohd Helmy Abd Wahab
Saeed Saqib
Dragolealarisa Dragolea
Alfredo Rodriguez-Sedano
Badeaana-Cornelia
Hung-Jen Yang
Michaela Stanickova
Zengshi Chen
Zubir Mat Jafri
Emmanuel Lopez-Neri
Nikos Loukeris
Nikolaos Doukas
Marius Marcu
Chenwen Zheng
Perumal Pitchandi
Sandra Sendra
Mihai Timis
Tiberiu Socaciu
Muhammad Musaddique Alirafique
Yang Zhang
Ioana Adrian
Lesley Farmer
Vehbi Neziri
Marios Moschakis
Anel Tanovic
Alejandro Fuentes-Penna
Arun Sharma
Shaikh Abdul Hannan
Constantino Martins
Hassan Chizari Chizari
Saad Alharbi
Ming-Shenjian
Lukas Kouril
Hime Aguiar
Yi-Chao Wu
Yixin Bao
Sawtantar Singh Khurmi
Vasile Paulbresfelean
Sorinel Oprisan
Waqas Bangyal
Panagiotis Gioannis
Amjad Mahmood
Noraida Haji Ali
Gabriela Mircea
Mirela-Catrinelvoicu
Abdel-Badeehsalem
Jian Qinaggao
Shahram Javadi
Markus Rentschler
Eustache Muteba Ayumba
Jussi Koskinen
Chandrasekaran Manoharan
Maria Dobritoiu
Fernando Reinaldo Ribeiro
Ismail Rakip Karas
Kevin Kam Fung Yuen
Muntean Mihaela
Petr Hajek
Vipin Balyan
Wan Hussain Wan Ishak
Alexandergelbukh
Ljubomir Lazic
Alina Adrianaminea
Santhosh Kumar.Bb
Sumanth Yenduri
Konstantin Volkov
David Nicoleta
Armin Najarpour Foroushani
Matteo Nunziati
Sergey Stankevich
Jorge Magalhaes-Mendes
Thaweesak Yingthawornsuk
Santoso Wibowo
Daniela Litan
Zakaria Zubi
Muhammad Zakarya
Vinod Ds

Preface

This year the 6th WSEAS European Computing Conference (ECC '12) was held in Prague, Czech Republic, in September 24-26, 2012. The conference provided a platform to discuss network design, wireless networks, protocols and applications, software engineering, databases, development and simulation etc with participants from all over the world, both from academia and from industry.

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

The accepted papers of this conference are published in this Book that will be 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 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: OptimalSQM: Optimal Software Quality Management Repository is a Software Testing Center of Excellence 15
Ljubomir Lazic

Plenary Lecture 2: Artificial Bee Colony (ABC) Algorithm with Crossover and Mutation 16
Milan Tuba

Plenary Lecture 3: Multidimensional Optimization Problems in Tropical Mathematics with Applications to Location Analysis 17
Nikolai Krivulin

Plenary Lecture 4: Performance Management Systems (PSM) Construction and Analysis 18
Jiří Strouhal

Plenary Lecture 5: Intelligent Information Technologies Used for E-Learning Systems 19
Badea Lepadatescu

Plenary Lecture 6: Global Navigation Satellite Systems Applications in Modern Aviation and Terrestrial Applications 20
Krzysztof A. Cyran

Denoising Algorithm Using Adaptive Block Based Singular Value Decomposition Filtering 23
Somkait Udomhunsakul

Problem Resolution Processes in Computer Science Teaching 30
José Francisco Zelasco, Gustavo López, Jose Manuel Cabo Herández, Judith Donayo

Data Compression and Clustering: A "Blind" Approach to Classification 35
Bruno Carpentieri

Quality of Data in Information Systems 41
Stanislava Simonova, Iva Zavadilova

An Unequal Error Protection Using Prioritized Network Coding for Scalable Video Streaming 47
Jisun Yoon, Chunsoo Ahn, TaeMin Cho, Jitae Shin

Distributed Function Constraints with Action Construction and Implementation 53
Susumu Yamasaki

Sequencing on Tightly Dependent Dataset with Genetic Algorithms 59
Didem Abidin

Visualization of Lighting Circuits in the Home 65
Jana Jurinová, Miroslav Ölvecký

Comparative Study on Applicability of Four Software Size Estimation Models Based on Lines of Code 71
Ljubomir Lazić, Mile Petrović, Petar Spalević

ISBN: 978-1-61804-126-5

Trustworthiness in Electronic Voting System Design 81
Petr Silhavy, Radek Silhavy, Zdenka Prokopova

Requirements Size Estimation Model Case Study 85
Petr Silhavy, Radek Silhavy, Zdenka Prokopova

A New Instance Weighting Method for Transfer Learning 89
Bariş Koçer, Ahmet Arslan

GPGPU Accelerated Optimization Method of Interconnection Network Topology 95
Vladimír Siládi, Ladislav Huraj, Michal Povinský

Problem Resolution Processes in Computer Science Teaching 101
José Francisco Zelasco, Judith Donayo, Gustavo López, Jose Manuel Cabo Herández

Software Test Suite Size Reduction by Applying Cause-Effect Graphs and Combinatorial Testing 107
Ljubomir Lazić, Radomir Janković, Branislav Milojković

A Logic Based Feature Selection Method for Improving the Accuracy of Data Mining Classification Algorithms 117
Mehmet Hacibeyoglu, Ahmet Arslan, Sirzat Kahramanli

Implementation of Dynamic Voltage Restorer for Mitigation of Voltage Sags in the Distribution System 123
Dominik Viglaš, Anton Beláň, Žaneta Eleschová, Peter Janiga

Computational Study of Microbial Depolymerization Processes of Xenobiotic Polymers 128
Masaji Watanabe, Fusako Kawai

Fog Border Detection in the Airflow Image 134
J. Richter, J. Stastny

Two Multi-Criteria Evolutionary Algorithms for a Multi-Path Evacuation Problem 140
Pedro Cardoso, Mario Jesus, Pedro Guerreiro, Paula Ribeiro, Alberto Marquez, José-Ramón Portillo

A Complete Closed-Form Solution to a Tropical Extremal Problem 146
Nikolai Krivulin

Blended Learning as a Strategy to Eliminate the Shortages of Traditional Education 152
Miroslav Ölvecký, Jana Jurinová, Ladislav Huraj

Artificial Bee Colony (ABC) Algorithm with Crossover and Mutation 157
Milan Tuba

Firefly Algorithm with a Feasibility-Based Rules for Constrained Optimization 163
Ivona Brajevic, Milan Tuba, Nebojsa Bacanin

Improved Adaptive Median Filter for Denoising Ultrasound Images 169
Nikola Rankovic, Milan Tuba

An Internet of Things Oriented Approach for Water Utility Monitoring and Control 175
Cristina Turcu, Cornel Turcu, Vasile Gaitan

ISBN: 978-1-61804-126-5

A New ARAML Algorithm for the Identification of a Stochastic Reduced Volterra Model 181
Imen Laamiri, Anis Khouaja, Hassani Messaoud

Using Web Analytics to Study Non-Price Competition in the E-Commerce Environment 187
Renata Bilkova, Hana Kopackova

Measuring and Evaluating Energy Consumption in Street Lighting Networks 193
Peter Janiga, Dionýz Gašparovský, Anton Beláň, Žaneta Eleschová, Dominik Viglaš

OptimalSQM: Optimal Software Quality Management Repository is a Software Testing Center of Excellence 197
Ljubomir Lazić, Stevan A. Milinković, Siniša S. Ilić

New Method for Contour Extraction & Compression using Ramer Algorithm & Wavelet Transform 210
Ali A. Ukasha, Ahmed B. Abdurrhman

A Tropical Extremal Problem with Nonlinear Objective Function and Linear Inequality Constraints 216
Nikolai Krivulin

Identifying the Number of Sources in Speech Mixtures with the Mean Shift Algorithm 222
David Ayllon, Inmaculada Mohino, Cosme Llerena

Evolutionary Diagonal Quadratic Discriminant for Speech Separation in Binaural Hearing Aids 227
Roberto Gil-Pita, Lorena Alvarez Perez, Inma Mohino

Stress Detection through Emotional Speech Analysis 233
Inma Mohino, Roberto Gil-Pita, Lorena Alvarez Perez

Chain Creation between Parts of Performance Management Systems 238
Tarmo Kadak, Jiří Strouhal

A Solution of a Tropical Linear Vector Equation 244
Nikolai Krivulin

Comparison of Different Taxonomies of Automatic Speech/music/noise Classification Systems in Digital Hearing Aids 250
Lorena Alvarez Perez, Inma Mohino, Cosme Llerena Aguilar

Solving TSP using Genetic Algorithms - Case of Kosovo 256
Avni Rexhepi, Agni Dika, Adnan Maxhuni

Practical Issues in Temporal Authentication 261
Stevan Milinković, Branislav Milojković, Dragan Spasić, Ljubomir Lazić

D-Code: A Programming Language that Simulates Probability and Statistics Experiments using Modifiable Sided Dice (MSD) 267
Gaspar Porta, Trisha Bergthold, Robert Lindauer, Israel Wasserstein, Jose Francisco Zelasco

Permission, Prohibition and Default in Action Structures 275
Susumu Yamasaki

ISBN: 978-1-61804-126-5

A New Approach for Computing Levels of Animals Diseases 281
Hesham Ahmed Hassan, Hazem El-Bakry, Hamada Gaber Abd Allah

A Comparative Study of Time-Delay Estimation Techniques for Convolutive Speech Mixtures 291
Cosme Llerena Aguilar, Inma Mohino, Lorena Alvarez Perez

Intelligent Information Technologies Used for E-Learning Systems 297
Luminița Popa, Simona Sofia Duicu, Badea Lepădătescu

Software Engineering Used in Simulation of Flexible Manufacturing Systems 304
Adriana Fota, Sorin Barabas

Statistical Inference of Reliability Estimation of Industrial Processes 310
Adela-Eliza Dumitrascu, Anisor Nedelcu

Edit Distance Calculation by Phonetic Rules and Word-length Normalization 315
Byunggul Bae, Seung-Shik Kang, Byung-Yeon Hwang

Knowledge Management using Open Source Repository 320
Giulio Concas, Filippo Eros Pani, Maria Ilaria Lunesu

Face Detection Algorithm Based on Skin Color and Edge Density 326
Marko B. Stankovich, Milan Tuba

Vision-Based Algorithm for Real-Time Hand Posture Recognition 332
Bojan Markovich, Milan Tuba

Project Development Workshop in Computer Science Program applying the Competency Model Approach 338
José Francisco Zelasco, Gustavo López, Judith Donayo, Jose Manuel Cabo Herández

Building Open-Source Based Architecture of Enterprise Applications for Business Intelligence 343
Tomas Chlouba, Daniel Kminek

Computer Modeling, Simulations and Design Manufacturing Strategy in the Engineering Education 349
Josef Sedivy, Karel Dvorak

Software Security Analysis, Metrics, and Test Design Considerations 355
Ljubomir Lazić, Dženan Avdić, Aldina Pljasković

Application of Semantic and Structural Similarity for Schema Reuse in Conceptual Database Design 368
Mirta Baranović, Damir Kalpić, Ljiljana Brkić

Driver Classification Identification using Artificial Intelligence 374
L. Ekonomou, T. I. Maris

A Simulation Based Approach for Treatment and Limitation of Clinical Risks: The Arthroplasty Hip Surgery 380
Gallo Mosè, Aveta Paola, Converso Giuseppe, Santillo Liberatina Carmela

ISBN: 978-1-61804-126-5

A Simulation based Approach for Improving Healthcare Systems 387
Gallo Mosè, Di Nardo Mario, Teresa Murino, Santillo Liberatina Carmela

Healthcare Lean Thinking: Simulation of an Intensive Care Unit (ICU) 394
Guido Guizzi, Daniela Chiocca, Elpidio Romano

The Efficiency of Handling in an Aircraft Industry Simulation Model and Scenario Analysis 401
Daniela Chiocca, Teresa Murino, Liberatina C. Santillo, Elpidio Romano

A Forecasting Process for Highly Seasonal Products 408
Teresa Murino, Andrea Eminente, Giuseppe Naviglio

A Lean Redesign for a Manufacturing Process through Computer Simulation 416
Mosè Gallo, Teresa Murino, Liberatina Carmela Santillo

Facility Management: A Literature Review 423
Guido Guizzi, Daniela Miele, Riccardo De Carlini

Market Strategy Planning for Banking Sector: An Operational Model 430
Giuseppe Converso, Riccardo De Carlini, Luigi Guerra, Giuseppe Naviglio

Project Management Implementation for Healthcare Activities Organization 436
Giuseppe Converso, Riccardo De Carlini, Liberatina C. Santillo, Giovanni Improta

Text Steganalysis using Evolution Algorithm Approach 444
Roshidi Din, T. Zalizam T. Muda, Puriwat Lertkrai, Mohd Nizam Omar, Angela Amphawan, Fakhrul Anuar Aziz

A Hybrid Genetic Algorithm for the Rich Vehicle Routing Problem 450
Ismail Yusuf, Mohd. Sapiyan Baba, Nur Iksan

PASWSF: Personalized Agent-based Semantic Web Service Framework 457
Islam Hany Harb, M. Ezz, H. Farahat

Ontology Transformation in Function of User-Interface Creation 472
Saša Arsovski

A Dynamic Milk Run in WEEE Reverse Logistics 478
Guido Guizzi, Roberto Revetria, Daniela Chiocca, Elpidio Romano

Magneto-Rheological Damper Hysteresis Characterization for SAS Systems 485
D. Ghorbany, H. R. Karimi, Y. Iskandarani

FIR Filtering on ARM Cortex-M3 490
Alexandru Bârleanu, Vadim Băitoiu, Andrei Stan

Current Managerial Communication Based on Modern Technology and Cross-Cultural Exchanges 495
Marcel Pikhart

CT and MRI Data Processing for Rapid Prototyping 499
Vaclav Skala

On Optimizing Payments Clearance Business Process – An Evolutional Approach 505
Deniss Kumlander

ISBN: 978-1-61804-126-5

The Geocode Correction in the Database as a Base for Spatial Analysis 511
Zdena Dobesova

Uncertainty Management Framework Elements – Test Based Verification of the Process 517
Deniss Kumlander

The Computerized Establishing of Orthodontic Diagnosis through Radiographic Analysis 522
Georgeta Zegan, Dragoş Gavriluţ, Cristina Gena Dascălu

Authors Index 527

ISBN: 978-1-61804-126-5

Plenary Lecture 1

OptimalSQM: Optimal Software Quality Management Repository is a Software Testing Center of Excellence

Assistant Professor Ljubomir Lazic
State University of Novi Pazar
Serbia
E-mail: llazic@np.ac.rs

Abstract: Development of quality software is very complicated and unreliable task, but the management of software development and testing process (SDP-STP) is much harder without appropriate software environment consisting of integrated techniques, procedures and tools for: a) precise planning (resources, costs, duration, training, etc.), b) software project risk identification, estimation and control, c) software quality metrics and measurement establishment, d) process testing quantitative management, i.e. management of activities needed for software quality assurance in order to increase efficiency of software bugs detection and removal. Our OptimalSQM Framework solution is based on a Business Intelligent Simulation Architecture (BISA) with integrated Software expert tools (Profit eXpert, Planer eXpert, Risk Management eXpert, Quality eXpert, Maintenance eXpert, People Performance eXpert and Process Dynamics Control eXpert) to find optimal development activity combination at the beginning for every SDLC model. The BISA architecture is coherent, balanced and improved version of OptimalSQM (partially defined in our former projects), providing the full service spectrum that satisfy the highest maturity level (4 and 5) of SPD-SPT according to SEI CMM and TMM methodologies. The BISA realization with complete integrated expert tools will offer to SMEs the following: 1) Web portal-repository of the best models and techniques from practice, all integrated into optimized and quantity driven software testing and maintenance process; 2) Automatic process planning based on models for software volume, cost, number of designers, duration, etc. estimation; 3) Environment for computer-aided experimenting based on principles of planed experiment with rules by wizards; 4) The environment for scenario of qualitative software development simulation that allows cost and risk minimization by alternative testing plans choice, which satisfy constraints related to free resources, optimization criteria and performances of a company; 5) Economical model of software quality for SQA activities evaluation of the investment benefit, measures that should be taken in order to improve software process development and testing (SPD-SPT) based on economical parameters (ROI, BCR, CAPEX, OPEX, etc.); 6) Balanced productivity metrics based on Balanced Scorecard methodology an 6-Sigma strategy for constant SDP-STP improvement; 8) Web-based GUI development; 9) Data and documents sharing with standard working environments of team members, like MSOffice and MSProject, etc. OptimalSQM solution aim is to assist with advanced software testing technology adoption in organizations, especially focusing on small- to medium-sized enterprises (SMEs) i.e. OptimalSQM solution is a Software Testing Center of Excellence for SMEs.

Brief Biography of the Speaker:
Ljubomir Lazic graduated from the University Electrical Engineering School, Serbia in 1979. In the 1980s he worked as Embedded Software and Hardware Test Engineer, Test Manager and Senior Researcher at Military Technical Testing Center (MTTC). He was a member of MTTC's Scientific Council, Belgrade, Former Yugoslavia and ICT Military Expert at Yugoslav Army Headquarters. Also in the 1990s, he has been working for a local telecommunications SIEMENS Company in Belgrade as Chief Engineer in Sales & Marketing Division, Installation & Commissioning Manager and Maintenance Manager. He continued to serve industry in a variety of roles, including consulting, executive education, and expert testimony. He is docent in Computer Science at the State University of Novi Pazar, Serbia (2007- current), and docent in Software Engineering, University Union of Belgrade (2006-2010). His research interests are in Software Engineering, Software Project Management, Software Testing, Human Computer Interaction, and Component Based Engineering. Current research interests, doing as a Project leader, in two projects supported in part by the Ministry of Science and Technological Development of the Republic of Serbia under Grant No. TR-1318 (2008-2011) and TR-35026 (2011-2014) are: Optimal software project management, Software Metrics, Effort Estimation Modeling etc. He is author of about 90 papers published in international journals and conference proceedings, invited speaker (Keynote speaker at QA&TEST 2010, 9th International Conference on Software QA and Testing on Embedded Systems, 27-28-29 October - Bilbao, Spain, 2010) and book chapters.

Plenary Lecture 2

Artificial Bee Colony (ABC) Algorithm with Crossover and Mutation

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

Abstract: Combinatorial and continuous hard optimization problems were recently successfully approached by nature inspired metaheuristics. Swarm intelligence represents an important subclass of nature inspired algorithms and artificial bee colony (ABC) is one of its relatively new members. For all such heuristically guided search algorithms, balance between exploitation and exploration is most important. If that balance is not achieved the algorithm can be (by too much exploitation) prematurely trapped in local optima, or it can (by too much exploration) avoid convergence similarly to pure Monte Carlo search. It is generally considered that employed bees and onlooker bees in the ABC algorithm perform exploitation, while scout bees perform exploration. We have shown that the real situation is more complicated: some exploration is actually done by the employed bees and a way in which a new candidate solution is generated is of crucial importance. Previously we improved the ABC algorithm for a class of problems by limiting the new solution location from the hyper-cube to the diagonal and its projections between two existing solutions. Here we introduce new solution generation with a technique similar to the crossover from genetic algorithms and show additional improvement in the ABC algorithm. Also, in the scout phase random solution generation can successfully be replaced by a controlled mutation.

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

ISBN: 978-1-61804-126-5

Plenary Lecture 3

Multidimensional Optimization Problems in Tropical Mathematics with Applications to Location Analysis

Associate Professor Nikolai Krivulin
Faculty of Mathematics and Mechanics
St. Petersburg State University
RUSSIA
E-mail: nkk@math.spbu.ru

Abstract: We consider multidimensional optimization problems that are formulated in the tropical (idempotent) algebra setting. The problems under study are to minimize nonlinear functionals defined on finite-dimensional semimodules over idempotent semifields, and they may have additional constraints imposed on the feasible solution set in the form of linear equations and inequalities. We start with a brief introduction into idempotent algebra, and then overview preliminary results including solutions to linear equations and eigenvalue-eigenvector problems to provide a framework for further results. Furthermore, we examine unconstrained problems and give general comprehensive solutions to the problems in a closed-form. These solutions are then extended to handle certain constrained problems. Finally, the above results are applied to both unconstrained and constrained multidimensional minimax single facility location problems with Chebyshev and rectilinear distances.

Brief Biography of the Speaker:
Nikolai Krivulin received a university degree in applied mathematics and operations research in 1983 from St. Petersburg State University (SPbSU). He got his Ph.D. degree in 1990 and D.Sc. degree in 2010 both in applied mathematics from SPbSU. In 1983 he joined the Computer Center at SPbSU as a system software engineer, and in 1985 started his Ph.D. study. In 1987 he joined the Faculty of Mathematics and Mechanics at SPbSU as an Assistant Professor, and became an Associate Professor in 1990. From 1999 to 2002 he was the head of the Department of Information Management in the Graduate School of Management at SPbSU.
He is currently an Associate Professor of the Department of Statistical Modelling at St. Petersburg State University. His research interests include theory and applications of idempotent algebra, modelling and performance evaluation of queueing systems, methods of optimization, computational statistics and computer simulation. He is author and coauthor of more than 70 papers in reviewed journals and conference proceedings, books chapters, textbooks, and a monograph. He was a grantee of national and international foundations, including the Russian Foundation for Basic Research, the Russian Foundation for Humanities Research, the NATO Science Foundation, the USIA and Eurasia Foundation (USA), and the Royal Society (UK). He served as a member of program and organizing committees of international conferences on mathematics, computer sciences, and information technology. He is a member of the St. Petersburg Mathematical Society, AMS, and SIAM.

ISBN: 978-1-61804-126-5

Plenary Lecture 4

Performance Management Systems (PSM) Construction and Analysis

Dr Jiří Strouhal
Department of Business Economics
University of Economics Prague
Czech Republic
E-mail: strouhal@vsc.cz

Abstract: Many references can be found in literature indicating that there have been difficulties in implementation of performance management systems (PMS) not allowing to gain the full benefit from the system (Business Intelligence, 2000; Kaplan and Norton, 2000). There are certainly many success stories, but there is now growing literature addressing the difficulties of implementation and it is claimed by some that 70 per cent of performance measurement initiatives fail (McCunn, 1998). The same rate (70%) marks failures of Balanced Scorecard (BSC) implementation (Neely and Bourne, 2000). Waal (2002) says that 56% of performance management projects fail. Research studies have shown that PMS implementation in industry still lags far behind expectations (Olsen et al., 2007).
Insufficient implementation and/or lack of inefficient PMS may lead to the poor organisational performance and on the contrary.
The two institutions LGMB and the Audit Commission in the UK suggest that, in order to improve both organisational and individual performance, the following management functions are important: (i) defining and setting organisational and individual aims and objectives; (ii) corporate planning; (iii) linking organisational strategy and service objectives to jobs and clients; (iv) identifying staff training and development needs; (v) assessing the results through personal appraisal using relevant performance indicators; (vi) performance agreements or contracts; (vii) using the knowledge gained through training to modify performance attitudes; (viii) external and internal communication systems; (ix) organisation development and performance review.
There are studies which have examined the current use of performance management. It has been pointed out that 56% of performance management projects fail, especially in the functioning phase (Waal, 2002; Waal and Counet, 2006). This implies that the functioning phase is not less important than the structural design phase. Regular activities which constitute the functioning of PMS are: data collection, analysis, drawing up and presenting reports, communication, interpreting, managers and top level must peruse reports, react to them, feedbacking with “carrot and stick“ judgement is important, planning of adjusting activities (with new KPI target values), executing of adjusting activities (the new activities probably involve that post-strategy actions will be somewhat influenced by them and they need to be adjusted slightly in the new light).
PMS functioning classically starts when implementation ends and operation by “new rules“ begins. In reports milestones set in the PMS structure, their achievement and communication of results are monitored.

Brief Biography of the Speaker:
Jiří Strouhal graduated from the University of Economics Prague in 2003 and finished his doctoral studies in 2005. In 2006 he became an accounting expect (Czech accounting profession certification scheme based on British ACCA curricula). In the period 2007 – 2009 he was member of the Committee for Education and Certification of Accountants Czech Republic and Executive Board member of the Chamber of Certified Accountants (Union of Accountants CR). From 2011 he is President of Chamber of Certified Accountants Czech Republic and member of Accreditation Committee of this professional organization.
He is reputed academician and practitioner; he published more than 400 research outputs, from which could be stated 25 monographers in the area of accounting and corporate finance, more than 40 research papers published in reputed databases (ISI, SCOPUS – important piece of them in WSEAS/NAUN research journals). His SCOPUS H-index is 7 and his Google Scholar H-index is 10. His major is corporate financial reporting, partially focused on international accounting harmonization and financial securities reporting.
He was a plenary speaker of DEEE 2010 conference in Tenerife, E-ACTIVITIES 2011 conference in Jakarta, and conferences in Harvard (ICBA 2012) and Cambridge (EDUCATION 2012). Also did organized special sessions focused on measurement issues in finance and accounting at WSEAS conferences in Timisoara (EMT 2010), Iasi (AEBD 2011), Angers (EMT 2011), Harvard (ICBA 2012), Porto (AEBD 2012) and Zlin (FAA 2012). He was a chair of Zlin conferences which were held in September 2012 at Tomas Bata University in Zlin, Czech Republic.

ISBN: 978-1-61804-126-5

Plenary Lecture 5

Intelligent Information Technologies Used for E-Learning Systems

Assoc. Prof. Badea Lepadatescu
Transilvania University of Brasov
Faculty of Technological Engineering and Industrial Management
Department of Manufacturing Engineering
Romania
E-mail: lepadatescu@unitbv.ro

Abstract: Creating value people has become the primary objective of any learning systems. In reality, in the last time, this expression is hidden behind a lot of issues often overlooked. Using intelligent information technologies for e-learning systems we are building an information society, which can not be done without research and investment projects in education. Computers become more useful when artificial intelligence techniques are incorporated both in equipment and programs and the tasks are performed more effectively and at lower cost. Competence is the ultimate desire in Romanian higher education system and not even technologies or theories or other kind of approach will not eliminate/neglect professor-student relationship. In this paper, we will analyze the roles of intelligent information technologies used for higher education e-learning systems. Intelligent information technologies used for e-learning in Romanian higher education system are on stage of intensive development and probably each month, year and other period will bring new achievements in this field.

Brief Biography of the Speaker:
Badea Lepadatescu is currently an Associate Professor at the Faculty of Technological Engineering and Industrial Management of Transylvania University of Brasov, Romania. He obtained his doctoral degree in 1998 in the area of machining through superfinishing process. After he graduated he worked five years as design engineer at Roman truck factory in the field of manufacturing processes where he designed many devices and special machine tools especially for superfinishing process. Started on 1982 he worked as research engineer at Transilvania University of Brasov, and after 1997 he is teaching at Department of Manufacturing Engineering. His main academic interests include Tolerance and Dimensional Control, Manufacturing Engineering Processes, Automation Processes, and Renewable Energy Sources. The research accomplishments are reflected through publications in a five books and authored or co-authored over 120 papers published at international conferences. He has extensive experience in both experimental and theoretical research work having more than 50 contracts with factories to design and produce machine tools for machining processes. Also in the field of Renewable Energy Sources together with a team he made two wind turbines, one with horizontal axis for taking water, and one with vertical axis to produce electric energy. He has been speaker to international conferences, has moderated forums, organized symposia, workshops and sessions at major international conferences.

ISBN: 978-1-61804-126-5

Plenary Lecture 6

Global Navigation Satellite Systems Applications in Modern Aviation and Terrestrial Applications

Professor Krzysztof A. Cyran
Director of the Virtual Flying Laboratory (VFL)
Poland
E-mail: krzysztof.cyran@polsl.pl

Abstract: Global navigation satellite systems (GNSS) have become present in virtually all areas of social, commercial and private life. This technology became an essential component for modern navigation on land, water and air. Its use extended also to map making and land surveying and today's uses of it go further beyond the preliminary applications. Currently, we can talk about multiconstellation GNSS. It is composed not only of American GPS, but also of additional constellations used for corrections of the signal, such as for example: Wide Area Augmentation System (WAAS) in the USA, or European Geostationary Navigation Overlay Service (EGNBOS) in Europe. It is also well known that European Union decided to launch its own GNSS program called Galileo, however it is still far from operational phase. Recently, Russia implemented its own GNSS called GLONASS and China develops system called BeiDou (Chinese name of the Big Dipper constellation used for navigation, and hence, having metaphoric meaning: Compass).

The plenary lecture presents applications of contemporary multiconstellation GNSS in aviation and terrestrial applications based research performed within the EGALITE project (www.egalite-project.eu) funded by European Union, whose foundations arose from EDCN (EGNOS Data Collection Network) and the ability offered by innovative Virtual Flying Laboratory (VFL) at Silesian University of Technology. The project started with enhancements of a software package for gathering in MS SQL database the high-throughput satellite navigation data, which is integrated with 3D visualization module GPS3D Viewer. The software package is also integrated with PEGASUS, a program authorized by EUROCONTROL organization. The database and the GPS3D Viewer are designed and functionally extended using the most recent software development technologies for continuous storing, administrating and post-processing of the EGNOS signal data. Their operation within distributed, Pan-European EDCN system has already made possible detection of important but rare events, such as sudden accuracy degradation, subject for further identification by EUROCONTROL, an organization responsible for the safe use of satellite navigation in European civil aviation. Additionally to single constellation signal, the more accurate localization can be achieved in Ground Based Augmenting System (GBAS) or Satellite Based Augmenting System (SBAS). The example of the first is the European Positioning (EUPOS) network delivering correction signals by radio, the example of the second is WAAS in the USA or EGNOS, a common project of European Union, European Space Agency (ESA) and European Organization for the Safety of Air Navigation (EUROCONTROL).

In the interdisciplinary EGALITE project, the innovative technologies originated from ICT are studied, varying from the on-ground precise positioning using GNSS and other sensors (for example in inertial navigation) as well as application of GNSS to vertical guidance in aviation in order to increase safety of the close-to-ground operations of helicopters. In such approach, it is necessary to consider the interplay of many qualitatively different factors, which act simultaneously and cause significant errors in positioning. The group of external factors such as architecture of GNSS systems in multiconstellation approach, influences the positioning accuracy by laws of physics, dynamics ionosphere and troposphere, and electromagnetic phenomena. The corrections of time scales caused by relativistic effects resulting both from Einstein's special and general (gravitational) theories of relativity have to be considered as well in any GNSS constellation. Additionally, internal factors, such as construction of the receivers, their ability of making use of augmentation signals, and computational algorithms applied are important for the final result of position measuring. Although mathematical models for positioning are generally known, the implementation of innovative computational algorithms can increase the accuracy in accordance with EUROCONTROL recommendations for the SBAS/EGNOS augmentation and the ionospheric range correction RCL1/L2.

As mentioned above, the performed research is using the capabilities of the Virtual Flying Laboratory (VFL) at SUT. It is an exceptional interdisciplinary laboratory, where cutting-edge technologies from aviation are combined with the newest trends in ICT, in particular, virtual reality and visualization, and with satellite navigation systems GNSS. VFL is co-financed by European Union from the European Regional Development Fund within the Project considered as a winner among more than 100 others in Silesia, the most industrial region in Poland. It is equipped with 14

ISBN: 978-1-61804-126-5

professional flight simulators, including full-size cockpit simulators: two cockpit simulators: ELITE Evolution S812 and ELITE Evolution S923 equipped with 3-channel visualization technology, are compliant with JAR-STD 3A (Evolution S923 is additionally capable for MCC); two others, manufactured by FLYIT (FAA approved: PHS for helicopter and PAS for aircraft), are installed in mobile class-room platforms with heating and air-condition. Due to mobility, it is possible to move them to distant places where research and/or demonstration field experiments are planned. The instrumentation includes a full IFR panel with all engine and fuel gauges, engine/rotor RPM, AH, ALT, ROC, T&B, HSI, VOR, ADF, and Transponder. Engine gauges can be selected as reciprocating or turbine. The software includes Jeppesen 20,000 airport database, with associated Navaids, and the entire earth surface with accurate elevation/obstructions. Software for PHS provides an accurate flight model including translation lift, ground effect, torque, auto-rotation for selectable 6 helicopter models: Piston R-22, R-44 (VFR-IFR), Schweizer 300 (VFR-IFR), Enstrom 280FX, Turbine-MD 500, Bell 206 (IFR). In stationary simulators such airplanes as Cessna 172RG, Piper Seneca III, Piper Arrow IV and King Air B200 are available. For all cockpit simulators, professional instructor command centres are supplied. Through command center, the operator can select any meteorological weather condition including precipitation, change clouds and wind direction and intensity at multiple elevations, record and replay flights, move a map, make a flight review, or print a flight path. Additionally, the professional GARMIN GNS430 original GNSS simulation devices are installed in stationary cockpit simulators, which, due to vertical navigation function, make possible to define various approaches, manoeuvres, and procedures based on GNSS. Particular problem of integration of flight simulator installed in VFL with the GNSS-based guidance system is described in more detail in a regular paper written by my collegues and me: O. Antemijczuk, D. Sokolowska, K.A. Cyran, “Integration of the MS ESP flight simulator with GNSS-based guidance system”, and presented at this conference separately.

Brief Biography of the Speaker:

Krzysztof A. Cyran graduated at Silesian University of Technology (SUT), Gliwice, Poland where he received his MSc degree in computer science (1992), PhD degree (with honours) in technical sciences (2000) and his DSc degree (habilitation) in technical sciences with specialty in computer science (2012). His PhD dissertation addresses the problem of automatic image recognition and his DSc dissertation concerns artificial intelligence, branching processes and coalescent methods in evolution of humans and early life. He has been an author and co-author of more than 100 publications with around 200 citations. Since 2012 he is an Associate Professor in the Institute of Informatics at SUT. Prof. Cyran (in 2003-2004) was a Visiting Scholar in Department of Statistics at Rice University in Houston, USA. After return from USA, he was the Vice-Head of the Institute of Informatics at SUT. Since 2011, he is the Director of the Virtual Flying Laboratory (VFL), the exceptional laboratory equipped with 14 professional flight simulators. The VFL has been co-funded by European Union, following favourable evaluation of Prof. Cyran’s and Ms. Sokołowska’s initiative to establish such laboratory in SUT to be a basis for performing research in the field of multiconstellation Global Satellite Navigation Systems (GNSS), including GPS, EGNOS and Galileo systems used in aviation. His current research interests are in image recognition and processing, artificial intelligence, digital circuits, decision support systems, rough sets, aviation and aeronautics, but he is interested also in computational population genetics and bioinformatics.

Prof. Cyran has been involved in numerous scientific grants awarded by Polish as well as European funds, including 7the Framework Program (7FP) of the European Union. In particular, he is the co-ordinator and the Scientist in charge in the EGALITE project. He is also local coordinator and Scientist in charge at SUT in SHERPA and HEDGE NEXT, the two others 7FP projects related to GNSS in aviation and implemented using professional VFL infrastructure. Prof. Cyran has received several awards of the Rector of the Silesian University of Technology for his scientific achievements, and he also has been rewarded by President of Poland for his scientific work at SUT. In 2004-2005 he was a member of International Society for Computational Biology. Currently he is a member of the Editorial Board of Journal of Biological Systems, member of the Scientific Program Committee of WSEAS international conferences in Malta (ECC’08), Rodos (AIC’08, ISCGAV’08, ISTASC’08) and multiconference in Crete (CSCC’08) as well as a reviewer for Studia Informatica and such journals indexed by Thompson Scientific as: Optoelectronic Review, Mathematical Biosciences and Engineering, Journal of Biological Systems, Neurocomputing, Mathematical Problems in Engineering, and Engineering Applications of Artificial Intelligence.

ISBN: 978-1-61804-126-5

Authors Index

Abd Allah, H. G. 281
Abdurrhman, A. B. 210
Abidin, D. 59
Ahn, C. 47
Amphawan, A. 444
Arslan, A. 89, 117
Arsovski, S. 472
Avdić, D. 355
Ayllon, D. 222
Aziz, F. A. 444
Baba, M. S. 450
Bacanin, N. 163
Bae, B. 315
Băitoiu, V. 490
Barabas, S. 304
Baranović, M. 368
Bârleanu, A. 490
Beláň, A. 123, 193
Bergthold, T. 267
Bilkova, R. 187
Brajevic, I. 163
Brkić, L. 368
Cabo Herández, J. M. 30, 101, 338
Cardoso, P. 140
Carpentieri, B. 35
Chiocca, D. 394, 401, 478
Chlouba, T. 343
Cho, T. 47
Concas, G. 320
Converso, G. 430, 436
Dascălu, C. G. 522
De Carlini, R. 423, 430, 436
Di Nardo, M. 387
Dika, A. 256
Din, R. 444
Dobesova, Z. 511
Donayo, J. 30, 101, 338
Duicu, S. S. 297
Dumitrascu, A.-E. 310
Dvorak, K. 349
Ekonomou, L. 374
El-Bakry, H. 281
Eleschová, Z. 123, 193
Eminente, A. 408
Ezz, M. 457
Farahat, H. 457
Fota, A. 304
Gaitan, V. 175
Gallo, M. 416
Gašparovský, D. 193
Gavriluț, D. 522
Ghorbany, D. 485
Gil-Pita, R. 227, 233
Giuseppe, C. 380
Guerra, L. 430
Guerreiro, P. 140
Guizzi, G. 394, 423, 478
Hacibeyoglu, M. 117
Harb, I. H. 457
Hassan, H. A. 281
Huraj, L. 95, 152
Hwang, B.-Y. 315
Iksan, N. 450
Ilić, S. S. 197
Improta, G. 436
Iskandarani, Y. 485
Janiga, P. 123, 193
Janković, R. 107
Jesus, M. 140
Jurinová, J. 65, 152
Kadak, T. 238
Kahramanli, S. 117
Kalpić, D. 368
Kang, S.-S. 315
Karimi, H. R. 485
Kawai, F. 128
Khouaja, A. 181
Kminek, D. 343
Koçer, B. 89
Kopackova, H. 187
Krivulin, N. 146, 216, 244
Kumlander, D. 505, 517
Laamiri, I. 181
Lazić, L. 71, 107, 197
Lazić, L. 261, 355
Lepădătescu, B. 297
Lertkrai, P. 444
Lindauer, R. 267
Llerena, C. 222, 250, 291
López, G. 30, 101, 338
Lunesu, M. I. 320
Maris, T. I. 374
Markovich, B. 332
Marquez, A. 140
Maxhuni, A. 256
Messaoud, H. 181
Miele, D. 423
Milinković, S. A. 197, 261
Milojković, B. 107, 261
Mohino, I. 222, 227 233
Mohino, I. 250, 291
Mosè, G. 380, 387
Murino, T. 387, 401
Murino, T. 408, 416
Naviglio, G. 408, 430
Nedelcu, A. 310
Ölvecký, M. 65, 152
Omar, M. N. 444
Pani, F. E. 320
Paola, A. 380
Perez, L. A. 227, 233
Perez, L. A. 250, 291
Petrović, M. 71
Pikhart, M. 495
Pljasković, A. 355
Popa, L. 297
Porta, G. 267
Portillo, J.-R. 140
Povinský, M. 95
Prokopova, Z. 81, 85

ISBN: 978-1-61804-126-5

Rankovic, N. 169
Revetria, R. 478
Rexhepi, A. 256
Ribeiro, P. 140
Richter, J. 134
Romano, E. 394, 401, 478
Santillo, L. C. 401, 416, 436
Santillo, L. C. 380, 387
Sedivy, J. 349
Shin, J. 47
Siládi, V. 95
Silhavy, P. 81, 85
Silhavy, R. 81, 85
Simonova, S. 41
Skala, V. 499
Spalević, P. 71
Spasić, D. 261
Stan, A. 490
Stankovich, M. B. 326
Stastny, J. 134
Strouhal, J. 238
Tuba, M. 157, 163, 169
Tuba, M. 326, 332
Turcu, Co. 175
Turcu, Cr. 175
Udomhunsakul, S. 23
Ukasha, A. A. 210
Viglaš, D. 123, 193
Wasserstein, I. 267
Watanabe, M. 128
Yamasaki, S. 53, 275
Yoon, J. 47
Yusuf, I. 450
Zalizam, T. 444
Zavadilova, I. 41
Zegan, G. 522
Zelasco, J. F. 30, 101
Zelasco, J. F. 267, 338

ISBN: 978-1-61804-126-5