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EUROPEAN COMPUTING CONFERENCE

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Proceedings of the 4th European Computing Conference (ECC '10)

Universitatea Politehnica, Bucharest, Romania, April 20-22, 2010

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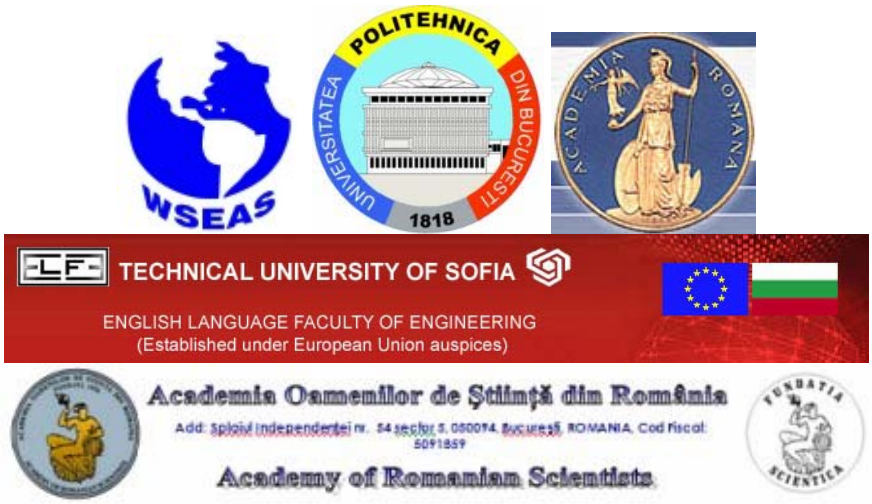
(Established under European Union auspices)

Academia Oamenilor de Ştiinţă din România
Academy of Romanian Scientists

ISBN: 978-960-474-178-6
ISSN: 1790-5117

Published by WSEAS Press
www.wseas.org



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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: 1790-5117
ISBN: 978-960-474-178-6

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Preface

This year the 4th EUROPEAN COMPUTING CONFERENCE (ECC '10) was held at Universitatea Politehnica, Bucharest, Romania, April 20-22, 2010. The conference remains faithful to its original idea of providing a platform to discuss software engineering, hardware engineering, artificial intelligence, cryptology, computer vision, remote sensing, robotics, fuzzy logic, graph theory, supercomputing, computers in education etc. with participants from all over the world, both from academia and from industry.

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

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

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

The Editors

Table of Contents

Plenary Lecture 1: Computer-Aided Process Planning and Scheduling Software for Make-to-Order Manufacturing of Machined Parts 13
Madalin Catana

Plenary Lecture 2: Statecharts Disentangled 14
Albert Hoogewijs

Plenary Lecture 3: AI Tools for Speech Analysis 15
Horia-Nicolai Teodorescu

Absence of Eigenvalues for Integro-Differential Operators 17
Marius-Marinel Stanescu, Dumitru Bolcu, Sabin Rizescu, Paul Rinderu

CELICA: A Multi-Agent Communication System for Electronic Commerce 23
Cristea Boboila, Nicolae Constantinescu

Using Smart Cards and X.509 Digital Certificates for a Student Management Information System at the University of Prishtina 29
Blerim Rexha, Haxhi Lajqi, Myzafere Limani

On an Optimal Parametric Iteration Method for Thin Film Flow 34
Vasile Marinca, Nicolae Herisanu, Dumitru Bala

Statecharts Disentangled 39
Benjamin De Leeuw, Albert Hoogewijs

Stochastic Timed Automata Simulator 52
Vaclav Kaczmarczyk, Michal Sir, Zdenek Bradac

Prediction Error Feedback for Time Series Prediction: A Way to Improve the Accuracy of Predictions 58
Ryad Zemouri, Paul Ciprian Patic

Modelling the Transport Phenomenon Involved in the Fusion-Welded 63
Ioan Sorin Leoveanu, Daniel Taus

Blind Equalization based on Information Theoretic Learning for Impulsive Noise Environments 69
Namyong Kim, Hyung-Gi Byun

Symbolic Equation using Modified Nodal Analysis for Linear Electrical Circuit using Matlab 73
Zoltan Erdei, Luiza Alexandra Dicso, Liviu Neamt, Oliver Chiver

Competency-based E-assessment in Project Management and Firm Performance: A Case Study 76
Constanta Nicoleta Bodea, Maria Dascalu

Just-In-Time Planning and Scheduling of Machining Operations on Parts: An Illustrative Case Study 82
Madalin Catana

A Model of Product Personality 88
Andrei Dumitrescu

Current Trends in Product Development 94
Mihaela Lupeanu, Corneliu Neagu, Alina Neacsu

Centralized Control System for Entry into Buildings 100
Marius-Constantin Popescu, Mircea Grigoriu

Pressure Adjusting Algorithm Command for a Chamber 106
Marius-Constantin Popescu, Mircea Grigoriu

Text Analytics as a Form of Knowledge Mining 112
Zeljko Panian

Modelling of Water Turbulent Flow in a Elipsocyclonic Nozzle 118
Mircea Grigoriu, Lucian Burlacu, Dan Victor Cavaropol

Numerical Simulation of Pollutants Dispersion in Storage Lakes 122
Mircea Grigoriu, Liviu–valentin Balanescu, Dan Victor Cavaropol, Marius Constantin Popescu

Evaluation of Form Deviations using Genetic Algorithms: Circularity Problem 126
Daniel-Silviu Manolache

Using Program Specific Search Operators in Test Data Generation 132
Mohammad Alshraideh

The Accessibility of Information in Computer Assisted Learning Process for Persons with Disabilities 139
Narcisa Isaila, Ion Smeureanu

XML Authoring Tool 143
Mihai Teohari, Copcea Larisa

Hybrid Expert System Shell 148
Petr Polach, Jan Valenta, Vaclav Jirsik

Contribution to the Implementation of the e-Infrastructure Concept at the National Level 154
Gabriel Neagu, Alexandru Stanciu

Comparative Study on Applicability of Two Novel Effort Estimation Models in Web Projects 160
Ljubomir Lazic, Nikos E. Mastorakis

Nonholonomic Geometry of Economic Systems 170
Constantin Udriste, Massimiliano Ferrara, Dorel Zugravescu, Florin Munteanu

The Usage of a Software to Process the SF-36 Data 178
Ion Moleavin, Cristina-Elena Dobrescu

Wavelet-Based Signal Analysis of a Vehicle Crash Test With a Fixed Safety Barrier 183
Hamid Reza Karimi, Kjell G. Robbersmyr

Fully Automated and Hidden System for Wiping Sensitive Data 189
George Pecherle, Cornelia Gyorodi, Robert Gyorodi, Bogdan Andronic

Mathematical Modeling and Analysis of a Vehicle Crash 194
Witold Pawlus, Jan Eivind Nielsen, Hamid Reza Karimi, Kjell G. Robbersmyr

Formal Verification of Secure Ad Hoc Routing Protocols using AVISPA: ARAN Case Study 200
Mihai-Lica Pura, Victor-Valeriu Patriciu, Ion Bica

GHSOM-Based Web Service Discovery 207
Florie Ismaili, Bogdan Shishedjiev, Xhemal Zenuni, Bujar Raufi

Web Page Analysis Based on HTML DOM and Its Usage for Forum Statistics and Alerts 212
Robert Gyorodi, Cornelia Gyorodi, George Pecherle, George Mihai Cornea

Using Java in Business Applications 218
Danut-Octavian Simion

A Solution for Secure SIP Conferencing over IMS and SAE 224
Cristina-Elena Vintila

Solutions for Traffic Lights Intersections Control 230
Marius Constantin Popescu, Constantin Ranea, Mircea Grigoriu, Marius-Constantin Popescu, Constantin Ranea

Natural Language Processing for Rapid Information 237
Maria Moise, Ciprian Gheorghe, Marilena Zingale

Nonlinear Command Simulation for Pump Functioning Powered by Electrical Drives 243
Marius-Constantin Popescu, Mircea Grigoriu

A Multi - Agent Based Architecture to Qualitative Temporal Constraint Reasoning 249
Tahar Guerram, Ramdane Maamri, Zaidi Sahnoun

Geographical Information System Module for Deriving the Flash Flood Hydrograph in Mountainous Areas 260
Matei Domnita, Augustin Ionut Craciun, Ionel Haidu, Saska-Zsolt Magyari

Thermo Process Monitoring Bars Medium Voltage under Short-Circuit Regim 266
Cristinel Popescu, Marius-Constantin Popescu, Constantin Ranea

AI Tools for Speech Analysis Applied to the Romanian Language 272
Horia-Nicolai Teodorescu

Rate Control and Mode decision Jointly Optimization in H.264AVC 280
Siavash Eshaghi, Hassan Farsi

A New Parallel Sorting on Diamond Architecture 284
Masumeh Damrudi, Kamal Jadidy Aval

Authors Index 288

Plenary Lecture 1

Computer-Aided Process Planning and Scheduling Software for Make-to-Order Manufacturing of Machined Parts

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Abstract: Process planning is a key function of manufacturing companies that is responsible for the determination of methods by which a product is to be manufactured economically and competitively. To efficiently perform this function, computer-aided process planning (CAPP) systems are widely used. On the other hand, scheduling is another important function of manufacturing companies that gives the time each manufacturing operation should start and finish on assigned machine for the due dates of manufactured products to be efficiently met. Many computer-aided scheduling (CAS) systems are being used for the optimization of scheduling function. Unfortunately, because a poor collaboration or integration of CAPP and CAS systems, scheduling problems may occur in overloaded shops or high production costs may be obtained even for optimized process plans. The CAPP-CAS software that will be discussed during the lecture is a solution to overcome process planning and scheduling collaboration problems at make-to-order manufacturing of machined parts. There will be described the working sessions with the software, in terms of inputted data and outputted results. Some concluding remarks will be made on the quality of planning and scheduling solutions delivered by the software and on its future development.

Brief Biography of the Speaker:
Madalin Catana graduated in 1991 the Faculty of Machine Manufacturing Technology from Polytechnic Institute of Bucharest, Romania. He received his Ph.D. degree in Industrial Engineering from University POLITEHNICA of Bucharest, Romania, in 2002, with a thesis on computer-aided process structure planning and scheduling of machining and assembly processes in machine manufacturing industry. Since 1998 he is a lecturer in the department of Machine Manufacturing Technology, Faculty of Engineering and Management of Technological Systems, University POLITEHNICA of Bucharest.
His current research interests include manufacturing technologies, production management, modeling and simulation of manufacturing processes and systems, and CAD/CAPP/CAM technologies. He has co-authored more than 40 papers published in Romanian technical journals and proceedings of national and international conferences, and 10 academic books and laboratory guides on production engineering and management, assembly and machining technologies, and computer numerical control programming. He performed researches within 6 national research projects.
At present, he is a member of Academic Association of Manufacturing Engineering, Romania, and of Romanian Association for Economic Engineering.

Plenary Lecture 2

Statecharts Disentangled

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Abstract: We present the main results of the research obtained by Benjamin De Leeuw in his PhD thesis: Statechart DNA: Formal and Psychological Investigation into a Machine Theory. We derive the simplified statechart (language) by excluding all redundant constructs of the UML (Unified Modeling Language) metamodel on statecharts. Simplified state machines and their memory model are the central abstraction used throughout this work. Any UML state machine or procedural program transforms to exactly one simplified state machine. We derive the language grammar for simplified state machines by composing a scripting language that further abstracts any useful state machine. Each grammar rule gets a visual counterpart within the state machine diagram and we show how all useful state machines can be grown from these scripts. The parse tree of this grammar can be normalized such that any state machine has exactly one script, called statechart dna.
The first practical application is the generation of state machine test cases for tools having them as their domain of discourse. The second application of the theory is model checking state machine behavior without assuming interleaved action execution. We show how the less strenuous location consistency ordering, can be used to calculate more realistic views on memory state values. We introduce a weighted and recursively calculated numerical value to each grammar rule application and from it derive a useful and measurable state machine complexity metric. Another important application is the detection of changes in state machine specifications. Text versioning systems use the ability to reconstruct any previously checked-in version from keeping track of so-called delta sets or change sets. In case of structured text like procedural program code it is even possible to automatically merge these text documents. Within the above theoretical framework we derive a technique to calculate delta sets on state machines and on how to handle merges consistently.

Brief Biography of the Speaker:
Albert Hoogewijs obtained his PhD in mathematics from the University of Ghent in 1974. He studied logic at the University of Utrecht with Dirk van Dalen. He worked on three-valued logic for software specification, and was visiting professor at several European Universities, in the context of the Galois Network, an Erasmus project in mathematics and computer science. He is full professor at the Department of Pure Mathematics and Computer Algebra of the University of Ghent. He supervised several PhD theses and wrote a lot of articles in the area of automated theorem proving and software specification.

Plenary Lecture 3

AI Tools for Speech Analysis

Professor Horia-Nicolai Teodorescu
Co-Authors: Laura Pistol, Monica Feraru, Marius Zbancioc, Ioan Pavaloi
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Abstract: Speech involves huge amounts of information that only recently and still partly can be analyzed with a level of sophistication comparable to the human brain. For most languages, few progresses have been done in their detailed analysis using automatic means and many linguists and phoneticians still rely on their hearing in speech evaluation. An interdisciplinary group from four institutions in Iasi, Romania, has united their efforts during more than a decade for the advancement of tools for the understanding of spoken language processes like prosody, emotional speech and personal characteristics of the voice. A consistent repository for the Romanian language, with a vast section on emotional speech was created and is available on the web. Problems overviewed in this plenary talk are the analysis and description and recognition of emotions in voice, the comparison of emotional speech characteristics in different European languages, interaction of grammar and speech in specific grammatical constructions, spoken language statistics of the Romanian language, and pathologies' effects on speech. We overview the principles of the computational tools developed and the results of speech analysis, with an emphasis on spoken language statistics and emotional analysis and recognition in speech. The tools presented include GRID applications for statistical analysis of voice, serial programs for automatic speech pattern identification with biometric and data mining applications, programs for precise determination of the prosodic traits like voice pitch, and programs for statistical characterization of emotional speech.

Brief Biography of the Speaker:
Prof. dr.dr.h.c. Horia-Nicolai L. TEODORESCU is a correspondent member of the Romanian Academy (since 1994) in the Science and Information Technology Section and IEEE Senior member. He is a professor at the Faculty of Electronics, Telecommunications and Information Technology, Dept. Applied Electronics and Intelligent Systems, The "Gheorghe Asachi" Technical University of Iasi. He is a Vice-Rector for International Relations and Academic Image. Also, he is the Director of the Institute of Computer Science, Romanian Academy.
He authored, co-authored, or co-edited more than 25 books and about 300 papers and holds 24 national and international patents (numerous gold, silver and bronze medals at invention fairs in Brussels, Geneva, Tunis etc.)
He acts as Vice-president of the Commission for the Informatisation of the Romanian Language, Chairman of the Commission for Fuzzy Systems and IA -Romanian Academy, Iasi Branch (since 2004), is a member of the Panel Information Technology, SPS-NATO (2008-2011). Prof. Teodorescu is Founding editor for many scientific reviews, member or former member of editorial committees for numerous journals from Romania or from abroad (former Associate Editor, IEEE Trans. Men, Systems, Cybernetics C; Fuzzy Sets and Systems; J. General Systems). He was the initiator and a promoter for many national and international scientific societies (SIGEF, AEDEM, the Romanian Society for Fuzzy Systems and the Balkan Union for Fuzzy Systems and Artificial Intelligence – BUFSA).

Authors Index

Alshraideh, M. 132
Andronic, B. 189
Aval, K. J. 284
Bala, D. 34
Balanescu, L.-V. 122
Bica, I. 200
Boboila, C. 23
Bodea, C. N. 76
Bolcu, D. 17
Bradac, Z. 52
Burlacu, L. 118
Byun, H.-G. 69
Catana, M. 82
Cavaropol, D. V. 118, 122
Chiver, O. 73
Constantinescu, N. 23
Copcea, L. 143
Cornea, G. M. 212
Damrudi, M. 284
Dascalu, M. 76
De Leeuw, B. 39
Dicso, L. A. 73
Dobrescu, C.-E. 178
Dumitrescu, A. 88
Eshaghi, S. 280
Farsi, H. 280
Ferrara, M. 170
Gheorghe, C. 237
Grigoriu, M. 100, 106, 118
Grigoriu, M. 122, 230, 243
Guerram, T. 249
Gyorodi, C. 189, 212
Gyorodi, R. 189, 212
Haidu, I. 260
Herisanu, N. 34
Hoogewijs, A. 39
Ionut Craciun, A. I. 260
Isaila, N. 139
Ismaili, F. 207
Jirsik, V. 148
Kaczmarczyk, V. 52
Karimi, H. R. 183, 194
Kim, N. 69
Lajqi, H. 29
Lazic, L. 160
Leoveanu, I. S. 63
Limani, M. 29
Lupeanu, M. 94
Maamri, R. 249
Magyari, S.-Z. 260
Manolache, D.-S. 126
Marinca, V. 34
Mastorakis, N. E. 160
Matei, D. 260
Moise, M. 237
Moleavin, I. 178
Munteanu, F. 170
Neacsu, A. 94
Neagu, C. 94
Neagu, G. 154
Neamt, L. 73
Nielsen, J. E. 194
Panian, Z. 112
Patic, P. C. 58
Patriciu, V.-V. 200
Pawlus, W. 194
Pecherle, G. 189, 212
Polach, P. 148
Popescu, C. 266
Popescu, M.-C. 100, 106, 122
Popescu, M.-C. 230, 243, 266
Pura, M.-L. 200
Ranea, C. 230, 266
Raufi, B. 207
Rexha, B. 29
Rinderu, P. 17
Rizescu, S. 17
Robbersmyr, K. G. 183, 194
Sahnoun, Z. 249
Shishedjiev, B. 207
Simion, D.-O. 218
Sir, M. 52
Smeureanu, I. 139
Stanciu, A. 154
Stanescu, M.-M. 17
Taus, D. 63
Teodorescu, H.-N. 272
Teohari, M. 143
Udriste, C. 170
Valenta, J. 148
Vintila, C.-E. 224
Zemouri, R. 58
Zenuni, X. 207
Zingale, M. 237
Zoltan Erdei, Z. 73
Zugravescu, D. 170