Editors:
Prof. Viorel Munteanu, ROMANIA
Prof. Razvan Raducanu, ROMANIA
Prof. Gheorghe Dutica, ROMANIA
Prof. Anca Croitoru, ROMANIA
Prof. Valentina Emilia Balas, ROMANIA
Prof. Luige Vladareanu, ROMANIA

Recent Advances in Automation & Information

Proceedings of the 11th WSEAS International Conference on AUTOMATION & INFORMATION (ICAI '10)

"G. Enescu" University, Iasi, Romania, June 13-15, 2010

Hosted and Sponsored by:
"G. Enescu" University

Recent Advances in Automation & Information

RECENT ADVANCES in AUTOMATION & INFORMATION

Proceedings of the 11th WSEAS International Conference on AUTOMATION & INFORMATION (ICAI '10)

"G. Enescu" University, Iasi, Romania
June 13-15, 2010

Recent Advances in Electrical Engineering
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5117
ISBN: 978-960-474-193-9

RECENT ADVANCES in AUTOMATION & INFORMATION

Proceedings of the 11th WSEAS International Conference on AUTOMATION & INFORMATION (ICAI '10)

"G. Enescu" University, Iasi, Romania, June 13-15, 2010

Recent Advances in Electrical Engineering
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

Copyright © 2010, by WSEAS Press

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

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

ISSN: 1790-5117
ISBN: 978-960-474-193-9

World Scientific and Engineering Academy and Society

RECENT ADVANCES in AUTOMATION & INFORMATION

Proceedings of the 11th WSEAS International Conference on AUTOMATION & INFORMATION (ICAI '10)

"G. Enescu" University, Iasi, Romania
June 13-15, 2010

Editors:
Prof. Viorel Munteanu, G. Enescu University, Romania
Prof. Razvan Raducanu, Al. I. Cuza University, Romania
Prof. Gheorghe Dutica, G. Enescu University, Romania
Prof. Anca Croitoru, Al. I. Cuza University, Romania
Prof. Valentina Emilia Balas, Aurel Vlaicu University, Romania
Prof. Luige Vladareanu, Romanian Academy, Romania

International Program Committee Members:
Leon O. Chua, USA
Brian A. Barsky, USA
K. R. Rao, USA
Bimal K. Bose, USA
Joseph Sifakis, France
Sidney Burrus, USA
Biswa Nath Datta, USA
Panos Pardalos, USA
Ronald Yager, USA
Stamatios Kartalopoulos, USA
Wlodek Duch, Poland,
Luis Alexandre, Portugal
Bruno Apolloni, Italy
Timo Honkela, Finland
Thomas Martinetz, Denmark
Guenter Palm, Denmark
Alessandro Sperduti, Italy
Michel Verleysen, Belgium
Alessandro E. P. Villa, France
Stefan Wermter, UK
Rudolf Albrecht, Austria
Peter Andras, UK
Valeri Mladenov,Bulgaria
Nikos Mastorakis, Bulgaria
Angela Slavova, Bulgaria
Plamen Angelov, UK
Robert Babuska, Netherlands
Gleb Beliakov, Australia
Hamid Berenji, USA
Michael Berthold, Germany
Hamid Bouchachia, Austria
Quek Hiok Chai, Singapore
Seungjin Choi, Korea
Gary Feng, Hong Kong
Dimitar Filev, USA
Paul Gader, USA
Masafumi Hagiwara, Japan
Isao Hayashi, Japan
Francisco Herrera, Spain
Richard Jensen, UK
Seul Jung, Korea
Janusz Kacprzyk, Poland
Okyay Kaynak, Turkey
Euntai Kim, Korea
Jin Young Kim, Korea
Kwang Baek Kim, Korea
Baoding Liu, China
Trevor Martin, UK
Radko Mesiar, Slovakia
Eduard Montseny, Spain
Mihail Popescu, USA
Thomas Runkler, Germany
Hideyuki Sawada, Japan
Pilar Sobrevilla, Spain
Woei Wan Tan, Singapore
Nipon Theera-Umpon, Thailand
Vicenc Torra, Spain
Enrique Herrera Viedma, Spain
Bo-Hyeun Wang, Korea
Xiao-Jun Zeng, UK
Erik Goodman, USA
Gilbert Syswerda, USA
Thomas Baeck, Germany
Marc Schoenauer, France
Ian Parmee, UK
Bill Punch, USA
Dave Schaffer, USA
Lotfi A. Zadeh, USA
Janusz Kacprzyk, Poland
Angel Kuri-Morales, Mexico
Pierre Borne, France
Demetrios Kazakos, USA
F.-K. Benra, Germany

Preface

This year the 11th WSEAS International Conference on AUTOMATION & INFORMATION (ICAI '10) was held at "G. Enescu" University, Iasi, Romania, June 13-15, 2010. The conference remains faithful to its original idea of providing a platform to discuss circuits and systems, electronics, filters, mobile communications, optoelectronics, signal processing, automatic control and robotics, human-machine systems and cybernetics, computational linguistics, natural language processing, computer algebra, artificial intelligence, image sequence processing, numerical analysis, microprocessors, computer architecture, software tools and environments, geometric modeling and fractals 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: Variational Based Image Inpainting Methods by using Cellular Neural Networks 12
Alexandru Gacsadi

Plenary Lecture 2: The Phenomenon Identification of air Circulation in Spaces with Harm Releases 13
Marius-Constantin Popescu

Timed Test Generation Based on Timed Temporal Logic 15
Stefan D. Bruda, Chun Dai

Rapid Virtual Prototyping of PLC-Based Control System 21
Kwan Hee Han, Seock Kyu Yoo, Bohyun Kim, Geon Lee

A Robust Control by Extended Static Output Feedback for Discrete-Time Uncertain Linear Systems 27
Addison Rios-Bolivar, Flor Narciso

Designing Robust AW Compensation for Uncertain Discrete-Time Linear Systems 33
Addison Rios-Bolivar, Francklin Rivas-Echeverria

On the Stability of Perturbed Discrete Linear Systems with Periodic Coefficients 39
Adam Czornik, Aleksander Nawrat

Business and Information Technology Alignment Through Business Service Orientation 44
Aida Amini Motlagh, Mir Ali Seyyedi

Approach on the High Frequency Electromagnetic Field Effects on Human Blood 50
Marius A. Silaghi, Ulrich L. Rohde, Ovidiu C. Fratila, Helga Silaghi, Tiberia Ioana Ilias

About the Oscillator Basics and Low-Noise Techniques for Microwave Oscillators and VCOs 55
Ulrich L. Rohde, Helga Silaghi, Marius A. Silaghi

Dynamic Matrix Control with Partial Decoupling 61
Skupin P., Klopot W., Klopot T.

Generalised Minimum Variance Control of MIMO Time-Varying System with Multiple Delays 67
Zheng Li, Christian Schmid

Detection of Motion Direction Implemented by Virtual Instrumentation 72
Nicolae Patrascoiu, Aron Poanta, Adrian Tomus, Bogdan Sochirca

A Novel End-to-End QoS Framework over Heterogeneous Networks - An Architectural Approach 76
Bogdan Iancu, Vasile Dadarlat, Adrian Peculea

Web Based Real-Time Meteorological Data Analysis and Mapping Information System 80
Refik Samet, Serhat Tural

Design of Safe PLC Programs by Using Petri Nets and Formal Methods 86
Eugen Ioan Gergely, Laura Coroiu, Alexandru Gacsadi

Vision Based Approaches for Driver Assistance Systems 92
Ioan Buciu, Alexandru Gacsadi, Cristian Grava

Formalism in Coding the Genetic Information 98
Iosif Mircea Neamtu, Alexandru Gacsadi

Variational Computing Based Image Inpainting Methods by Using Cellular Neural Networks 104
Alexandru Gacsadi

Applying Artificial Neural Networks in Environmental Prediction Systems 110
Mihaela Oprea, Alexandra Matei

AI Challenges in Iris Recognition. Processing Tools for Bath Iris Image Database 116
Nicolaie Popescu-Bodorin, Valentina E. Balas

Railway Wheelset Bending Flexibility 122
Traian Mazilu, Madalina Dumitriu, Cristina Tudorache, Mircea Sebesan

Analysis of Parallelization Effects on Textual Data Compression 128
Goran Martinovic, Caslav Livada, Drago Zagar

The Study of Vehicles' Displacement in Hard Conditions 133
Dinel Popa, Nicolae-Doru Stanescu

Digital Electronics Actions Based Rapid Accelerator Time 139
Ovidiu Neamtu

Mathematical Model of a Jet Engine Afterburning Fuel System 143
Alexandru Nicolae Tudosie

Mathematic Model and Technical Solution for Surveillance and Autonomous Monitoring System Based on Endurance Unmanned Aerial Vehicle 149
Teodor-Viorel Chelaru, Vasile Nicolae Constantinescu, Adrian Chelaru

Aircraft Double-Spool Single Jet Engine with Afterburning System 155
Alexandru Nicolae Tudosie, Constantin Lucian Sepcu

A(H1N1) Suspects Management Application 161
Dan Adrian Marior, Radu Zglimbea, Constantin Carciumaru

Multi-Objective Optimization Based on Robust Design for Etching Process Parameters of Hard Disk Drive Slider Fabrication 166
Pongsak Holimchayachotikul, Alonggot Limcharoen, Komgrit Leksakul, Guido Guizzi

A System Dynamics Model for a Single-Stage Multi-Product Kanban Production System 171
L. Guerra, T. Murino, E. Romano

A Simulative Approach to Optimize a Cooking Center 177
Daniela Rita Montella, Giuseppe Naviglio, Liberatina Carmela Santillo

Autonomy of a Land Vehicle eXPIO 183
Aleksander Nawrat, Damian Szuba

Study upon a Wood Processing Automatic Machine 189
Gabriel Nicolae Popa, Corina Maria Dinis, Sorin Ioan Deaconu, Angela Iagar

Authors Index 195

Plenary Lecture 1

Variational Based Image Inpainting Methods by using Cellular Neural Networks

Professor Alexandru Gacsadi
Electronics Department, University of Oradea
Str. Universitatii, No. 1, 410087, Oradea
ROMANIA
E-mail: agacsadi@uoradea.ro

Abstract: Image inpainting is an interpolation problem where an image with missing or damaged parts is restored. The most often used image inpainting applications are for pictures or films known or damaged partially. Discarding some unwanted parts, text or objects from the whole image space, special effects can be carried out using image restoration.
Complex mathematical models based on partial differential equations (PDE) or variational computing were proposed as techniques for restoring damaged or partially known images. Those methods are computational expensive and difficult to implement, even when a large serial processing computing power is available.
The Cellular Neural Networks (CNN) based parallel processing ensures computing-time reduction if the processing algorithm can be implemented on a continuous-time analogue CNN-UM (Cellular Neural/Nonlinear Networks Universal Machine) or using FPGA implemented emulated digital CNN-UM. Even if variational computing methods are used, the design of CNN templates ensuring the desired processing of the gray-scale image remains an important step.
In the present paper, some variational based CNN methods are presented and analyzed that can be used for the reconstruction of damaged or partially known images. Efficiency of these impanting methods can be enhanced by combining them with nonlinear template that ensures the growth of the local properties spreading area along with regional ones.

Brief Biography of the Speaker:
Alexandru Gacsadi received the M.Sc. and the Ph.D. degree in Electronic Engineering and Telecommunications, both from the “Politechnica” University of Timisoara, Romania, in 1986 and 2001, respectively. Since 1991 he is with the University of Oradea, Romania, and currently he is a professor at the Electronics Department of the Electrical Engineering and Information Technology Faculty responsible for teaching data acquisitions, cellular neural networks applications and robotics.
His research interests are in the area of neural networks, cellular neural networks and its applications, image processing and analysis with applications in medical imaging, processing and analysis of biomedical data, smart transducers, and robotics.
He has published more than 70 papers in national and international journals, conferences, workshops and symposium proceedings, authored 3 books and 5 application guides. He conducted or acting as active member for more than 15 research and development projects, grants and contracts in his field of interest.
Professor Alexandru Gacsadi has been involved in setting up national and international conferences as a reviewer and/or member of organizing committee. He is a member of the: IEEE Society (CAS), Society of Electronic Engineers from Romania and Romanian Society for Industrial Robotics.

Plenary Lecture 2

The Phenomenon Identification of air Circulation in Spaces with Harm Releases

Professor Marius-Constantin Popescu
Faculty of Engineering in Electromechanical
Environment and Industrial Informatics,
University of Craiova
B-dul Decebal, nr.107, 200440-Craiova
ROMANIA
E-mail: marius.popescu.c@gmail.com

Abstract: It is presents a method to identify the value of concentration in certain areas of rooms where the air is introducing superposition effect of flow convection natural/artificial and diffusion and a recirculation of its, which acts as a feedback circuit. Starting from the necessity of knowledge as accurate mathematical models that characterize the conduct of processes subject to automation was introduced progressively consider a simplified model of air recirculation for the release of carbon dioxide, then considered the phenomenon of flow convection, and finally was completed and the phenomenon of diffusion. Based on the results obtained by numerical simulation have made a number of conclusions regarding the location of the transducers, necessary to monitor environmental parameters and conclusions on specific points of execution. The result helps to understand how to conduct a recirculation phenomenon, and may form a basis for future adaptive adjustment of the concentration value of the room.

Brief Biography of the Speaker:
Marius-Constantin Popescu is Associate Professor of Department of Electromechanical of Faculty of Engineering in Electromechanics, Environment and Industrial Informatics Craiova within the University of Craiova, Romania. He has published more than 140 papers in national and international journals, conferences, workshops and symposium proceedings, authored 11 books and 10 application guides. He conducted or acting as active member for more than 17 research and development projects, grants and contracts in his field of interest.
Professor Marius-Constantin Popescu has been involved in setting up national and international conferences as a reviewer and/or member of organizing committee. He is a member of the: AGIR (General Association of Engineers in Romania), SRAIT (Romanian Society of Automation and Technical Informatics). He had participated in 9 WSEAS International Conferences, presenting papers and attending the scientific meetings. He has also 20 papers published by WSEAS Transactions and NAUN International Journals.

Authors Index

Addison, R.-B. 27, 33
Balas, V. E. 116
Bruda, S. D. 15
Buciu, I. 92
Carciumaru, C. 161
Chelaru, A. 149
Chelaru, T.-V. 149
Constantinescu, V. N. 149
Coroiu, L. 86
Czornik, A. 39
Dadarlat, V. 76
Dai, C. 15
Deaconu, S. I. 189
Dinis, C. M. 189
Dumitriu, M. 122
Flor, N. 27
Fratila, O. C. 50
Gacsadi, A. 86, 92
Gacsadi, A. 98, 104
Gergely, E. I. 86
Grava, C. 92
Guerra, L. 171
Guizzi, G. 166
Han, K. H. 21
Holimchayachotikul, P. 166
Iagar, A. 189
Iancu, B. 76
Ilias, T. I. 50
Kim, B. 21
Klopot, T. 61
Klopot, W. 61
Lee, G. 21
Leksakul, K. 166
Li, Z. 67
Limcharoen, A. 166
Livada, C. 128
Marior, D. A. 161
Martinovic, G. 128
Matei, A. 110
Mazilu, T. 122
Montella, D. R. 177
Motlagh, A. A. 44
Murino, T. 171
Naviglio, G. 177
Nawrat, A. 39, 183
Neamtu, I. M. 98
Neamtu, O. 139
Oprea, M. 110
Patrascoiu, N. 72
Peculea, A. 76
Poanta, A. 72
Popa, D. 133
Popa, G. N. 189
Popescu-Bodorin, N. 116
Rivas-Echeverria, F. 33
Rohde, U. L. 50, 55
Romano, E. 171
Samet, R. 80
Santillo, L. C. 177
Schmid, C. 67
Sebesan, M. 122
Sepcu, C. L. 155
Seyyedi, M. A. 44
Silaghi, H. 50, 55
Silaghi, M. A. 50, 55
Skupin, P. 61
Sochirca, B. 72
Stanescu, N.-D. 133
Szuba, D. 183
Tomus, A. 72
Tudorache, C. 122
Tudosie, A. N. 143, 155
Tural, S. 80
Yoo, S. K. 21
Zagar, D. 128
Zglimbea, R. 161