RECENT ADVANCES in NEURAL NETWORKS

Proceedings of the 10th WSEAS International Conference on NEURAL NETWORKS (NN'09)

Prague, Czech Republic
March 23-25, 2009
Editors:
Prof. Nikos E. Mastorakis, Technical University of Sofia, Bulgaria
Prof. Anca Croitoru, University "Al. I. Cuza" of Iasi, Romania
Prof. Valentina Emilia Balas, "Aurel Vlaicu" University of Arad, Romania
Prof. Eduard Son, Russian Academy of Sciences, Moscow, Russia
Prof. Valeri Mladenov, Technical University of Sofia, Bulgaria

International Program Committee Members:
Lotfi A. Zadeh, USA
Janusz Kacprzyk, POLAND
Leonid Kazovsky, USA
Charles Long, USA
Katia Sycara, USA
Roberto Revetria, USA
M. Isabel Garcia-Planas, SPAIN
Miguel Angel Gomez-Nieto, SPAIN
Akshai Aggarwal, CANADA
Pierre Borne, FRANCE
George Stavvakakis, GREECE
Angel Fernando Kuri Morales, MEXICO
Arie Maharshak, ISRAEL
Fumiaki Imado, JAPAN
Simona Lache, ROMANIA
Toly Chen, TAIWAN
Isak Taksa, USA
G. R.Dattatreya, USA
Branimir Reljin, SERBIA
Paul Cristea, ROMANIA
Preface

This year the 10th WSEAS International Conference on NEURAL NETWORKS (NN'09) was held in Prague, Czech Republic. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of learning theory, supervised and unsupervised learning, architectures of NN, clustering, hybrid and knowledge based networks, neuro-fuzzy systems, neurodynamics and attractor networks, neurobiology and neurosciences 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: Advances in Automated Diagnostic Systems**  
  Elif Derya Ubeyli  
  Page 9

- **Teachable Characters: Semantic Neural Networks in Game AI**  
  Harri Ketamo  
  Page 11

- **A New CMOS Current-Mode Classifier Circuit for Statistics Applications**  
  Cosmin Popa  
  Page 17

- **CMOS Computation Circuits with Increased Accuracy using FGMOS Transistors**  
  Cosmin Popa  
  Page 21

- **Study of Relationship between ICT and Economic Growth (Neural Network Approach)**  
  Omid Khodaveyrdi, Arezoo Mohandessi, Hossien Nemati  
  Page 25

- **A Differential Adaptive Learning Rate Method for Back-Propagation Neural Networks**  
  Saeid Iranmanesh  
  Page 30

- **Model for Estimating Venezuelan Population with Working Age using Artificial Neural Networks**  
  Samaria Munoz-Bravo, Anna Perez-Mendez, Francklin Rivas-Echeverria  
  Page 35

- **Stress Smoothing in Hexaedrons using Artificial Neural Networks**  
  Leonardo Ivirma, Mary Vergara, Sebastian Provenzano, Francklin Rivas, Anna Perez, Francisco Fuenmayor  
  Page 41

- **Prediction of Chaotic Time Series using Neural Network**  
  Hamid Yazdani  
  Page 47

- **An Artificial Neural Network Model for the Lifetime Estimation of Wood Poles Supporting the Overhead Hellenic Electrical Distribution Network**  
  C. A. Christodoulou, D. S. Oikonomou, P. M. Kyrtzopoulos, L. Ekonomou, N. Harkiolakis  
  Page 55

- **Self-Organizing Content Management with Semantic Neural Networks**  
  Harri Ketamo  
  Page 63

- **Advances in Automated Diagnostic Systems**  
  Elif Derya Ubeyli  
  Page 69

- **Short Term Load Forecasting in Greek Intercontinental Power System using ANNs: A Study for Input Variables**  
  Page 75

- **Emotion Recognition using Neural Networks**  
  Mehmet S. Unluturk, Kaya Oğuz, Coskun Atay  
  Page 82

- **Automated Plaque Diagnosis Utilizing Levenberg Marquardt & Radial Basis Function with Supervised Training of Chromatic Colors**  
  Hadzli Hashim, Faiirul Nazmie Osman, Norkhairiane Khairudin  
  Page 86

- **Neural Network for Audio Visual Moving Robot Tracking to Speaking Person**  
  Alexander Bekiarski, Snejana Pleshkova  
  Page 92
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Visual System with Cascade-Correlation Neural Network for Moving Audio Visual Robot</td>
<td>96</td>
</tr>
<tr>
<td>Alexander Bekiarski</td>
<td></td>
</tr>
<tr>
<td>Image Recognition with Neural Classifiers in Micromechanics and Agriculture</td>
<td>100</td>
</tr>
<tr>
<td>Tatiana Baidyk, Ernst Kussul, Oleksandr Makeyev, Alejandro Vega</td>
<td></td>
</tr>
<tr>
<td>Concept of Artificial Neural Network (ANN) and its Application in Cerebral Aneurism with Multi Walls Carbon Nanotubes (MWCNT)</td>
<td>104</td>
</tr>
<tr>
<td>Rodica-Mariana Ion, Daniel Munteanu, George-Costel Cocina</td>
<td></td>
</tr>
<tr>
<td>Spreading of Signal and Energy in the Electronic, Chemical and Mechanical Human Brain</td>
<td>108</td>
</tr>
<tr>
<td>Grmela Ales</td>
<td></td>
</tr>
<tr>
<td>Determining the Optimal Percent of Negative Examples used in Training the Multilayer Perceptron Neural Networks</td>
<td>114</td>
</tr>
<tr>
<td>Cosmin Cernazanu-Glavan, Stefan Holban</td>
<td></td>
</tr>
<tr>
<td>Enhanced Human Identification System using Dental Biometrics</td>
<td>120</td>
</tr>
<tr>
<td>Swarnalatha Purushotham, Margret Anouncia</td>
<td></td>
</tr>
<tr>
<td>Time Series Prediction of Respiratory Motion for Lung Tumor Tracking Radiation Therapy</td>
<td>126</td>
</tr>
<tr>
<td>Noriyasu Homma, Masao Sakai, Yoshihiro Takai</td>
<td></td>
</tr>
<tr>
<td>An Artificial Neural Network Digital Design for Time Difference of Arrival Method used on Passive Multistatic Radars</td>
<td>132</td>
</tr>
<tr>
<td>Nikos J. Farsaris</td>
<td></td>
</tr>
<tr>
<td>Review of Development of Nonconventional Neural Architectures at the Czech Technical University in Prague</td>
<td>138</td>
</tr>
<tr>
<td>Jiri Bila, Ivo Bukovsky, Jakub Jura</td>
<td></td>
</tr>
<tr>
<td>Discovering Potential Musical Instruments Teachers Using Data Clustering Approach</td>
<td>147</td>
</tr>
<tr>
<td>Cheng-Fa Tsai, Yu-Tai Su, Chiur-Yen Tsai, Chun-Yi Sung</td>
<td></td>
</tr>
<tr>
<td>Coding Capacity of Synchronous Neuronal Activity: Reliable Sparse Code by Synchrony within a Dendritic Compartment</td>
<td>153</td>
</tr>
<tr>
<td>Marton A. Hajnal</td>
<td></td>
</tr>
<tr>
<td>Impact of Weather Inputs on Heating Plant - Agglomeration Modeling</td>
<td>159</td>
</tr>
<tr>
<td>Pavel Varacha</td>
<td></td>
</tr>
<tr>
<td>Malay Language Document Identification using BPNN</td>
<td>163</td>
</tr>
<tr>
<td>Norzaidah Md Noh, Mohd Rusydi Abdul Talib, Azlin Ahmad, Shamimi A. Halim, Azlinah Mohamed</td>
<td></td>
</tr>
<tr>
<td>Fast Virus Detection by using High Speed Time Delay Neural Networks</td>
<td>169</td>
</tr>
<tr>
<td>Hazem M. El-Bakry, Nikos Mastorakis</td>
<td></td>
</tr>
<tr>
<td>Non Destructive Techniques of Automatic Shape Classification of Vegetal Products</td>
<td>184</td>
</tr>
<tr>
<td>Marius. Buzera, Valentina E. Balas, Gabriela Prostean, Nikos E. Mastorakis</td>
<td></td>
</tr>
<tr>
<td>Authors Index</td>
<td>188</td>
</tr>
</tbody>
</table>
Abstract: ANN models are computational modeling tools that have recently emerged and found extensive acceptance in many disciplines for modeling complex real-world problems. ANNs produce complicated nonlinear models relating the inputs (the independent variables of a system) to the outputs (the dependent predictive variables). ANNs are valuable tools in the medical field for the development of decision support systems. Important tools in modern decision-making, in any field, include those that allow the decision-maker to assign an object to an appropriate group, or classification. Clinical decision-making is a challenging, multifaceted process. Its goals are precision in diagnosis and institution of efficacious treatment. Achieving these objectives involves access to pertinent data and application of previous knowledge to the analysis of new data in order to recognize patterns and relations. Practitioners apply various statistical techniques in processing data to assist in clinical decision-making and to facilitate the management of patients. As the volume and complexity of data have increased, use of digital computers to support data analysis has become a necessity. In addition to computerization of standard statistical analysis, several other techniques for computer-aided data classification and reduction, generally referred to as ANN, have evolved. The ANN model discussed above has expanded in two directions. First, time series analysis and medical image analysis supply important parameters to medical decision making process and the parameters can be used as the input of the ANN model. The second direction of expansion includes databases available locally or through internet access. In the present study, advances in automated diagnostic systems will be presented.

Brief Biography of the Speaker: Elif Derya Ubeysi (http://edubeyli.etu.edu.tr/) is an Associate Professor at the Department of Electrical and Electronics Engineering, TOBB University of Economics and Technology. She obtained Ph.D. degree in Electronics and Computer Technology from the Gazi University in 2004. She has worked on variety of topics including biomedical signal processing, neural networks, optimization and artificial intelligence. She has worked on several projects related with biomedical signal acquisition, processing and classification. Dr. Ubeysi has served (or is currently serving) as a program organizing committee member of the national and international conferences. She is editorial board member of several scientific journals (Journal of Engineering and Applied Sciences; International Journal of Soft Computing; Research Journal of Applied Sciences; Research Journal of Medical Sciences; Scientific Journals International/Electrical, Mechanical, Manufacturing, and Aerospace Engineering; The Open Medical Informatics Journal; Bulletin of the International Scientific Surgical Association). She is Associate Editor of Expert Systems. She is serving as a guest editor to the Expert Systems on a special issue on “Advances in Medical Decision Support Systems”. Moreover, she is voluntarily serving as a technical publication reviewer for many respected scientific journals and conferences. She has also published 118 journal and 44 conference papers on her research areas.