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# Engineering Applications of Neural Networks

13th International Conference, EANN 2012  
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Proceedings



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# Preface

The First Engineering Applications of Neural Networks (EANN) conference was held in Otaniemi, Finland, in 1995. Since then the EANN conferences have provided academics and industry professionals from across the world with the opportunity to share experiences and to present and demonstrate advances in a wide range of neural network applications.

The 13th EANN 2012 conference was held on the London campus of Coventry University, UK, during September 2012. The primary sponsor for the conference was the International Neural Network Society (INNS). The 13th EANN 2012 attracted delegates from 23 countries across the world: Russia, USA, South Africa, Germany, Italy, UK, Greece, Switzerland, Spain, Brazil, India, Ukraine, France, Poland, Turkey, Chile, Israel, China, Cyprus, Taiwan, Portugal, Belgium, and Finland.

This volume includes the papers that were accepted for presentation at the conference, at the Workshop on Applying Computational Intelligence Techniques in Financial Time Series Forecasting and Trading (ACIFF), and the Workshop on the Computational Intelligence Applications in Bioinformatics (CIAB). The papers demonstrate a variety of applications of neural networks and other computational intelligence approaches to challenging problems relevant to society and the economy. These include areas such as: intelligent transport, environmental engineering, computer security, civil engineering, financial forecasting, virtual learning environments, language interpretation, bioinformatics and general engineering. All papers were subject to a rigorous peer-review process by at least two independent academic referees. EANN accepted approximately 40% of the submitted papers for full length presentation at the conference. The best ten papers were invited to submit extended contributions for inclusion in a special issue of the *Evolving Systems* journal (Springer).

The following keynote speakers were invited and gave lectures on exciting neural network application topics:

1. Nikola Kasabov, Director and Founder, Knowledge Engineering and Discovery Research Institute (KEDRI), Chair of Knowledge Engineering, Auckland University of Technology, Institute for Neuroinformatics - ETH and University of Zurich
2. Danil Prokhorov, President-Elect of INNS, Toyota Research Institute NA, Ann Arbor, Michigan
3. Kevin Warwick, University of Reading, England and Fellow of The Institution of Engineering & Technology (FIET)
4. Richard J. Duro, Grupo Integrado de Ingeniera Escuela Politecnica Superior, Universidade da Coruña

A tutorial on “Fuzzy Networks with Modular Rule Bases” was presented by Alexander Gegov from the University of Portsmouth, UK.

Two workshops were included in the EANN 2012 conference: Applying Computational Intelligence Techniques in Financial Time Series Forecasting and Trading (ACIFF 2012) focused on the scientific areas of computer engineering, finance and operational research; and Computational Intelligence Applications in Bioinformatics (CIAB 2012) focused on problems from the fields of biology, bioinformatics, computational biology, chemical informatics, and bioengineering.

On behalf of the conference Organizing Committee, we would like to thank all those who contributed to the organization of this year's program, and in particular the Program Committee members.

September 2012

Chrisina Jayne  
Shigang Yue

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# Table of Contents

Elimination of a Catastrophic Destruction of a Memory in the Hopfield Model . . . . .	1
<i>Iakov Karandashev, Boris Kryzhanovsky, and Leonid Litinskii</i>	
An Operational Riverflow Prediction System in Helmand River, Afghanistan Using Artificial Neural Networks . . . . .	11
<i>Bernard Hsieh and Mark Jourdan</i>	
Optimization of Fuzzy Inference System Field Classifiers Using Genetic Algorithms and Simulated Annealing . . . . .	21
<i>Pretesh B. Patel and Tshilidzi Marwala</i>	
Information Theoretic Self-organised Adaptation in Reservoirs for Temporal Memory Tasks . . . . .	31
<i>Sakyasingha Dasgupta, Florentin Wörgötter, and Poramate Manoonpong</i>	
Fuzzy-Logic Inference for Early Detection of Sleep Onset in Car Driver . . . . .	41
<i>Mario Malcangi and Salvatore Smirne</i>	
Object-Oriented Neurofuzzy Modeling and Control of a Binary Distillation Column by Using MODELICA . . . . .	51
<i>Javier Fernandez de Canete, Alfonso Garcia-Cerezo, Inmaculada Garcia-Moral, Pablo del Saz, and Ernesto Ochoa</i>	
Evolving an Indoor Robotic Localization System Based on Wireless Networks . . . . .	61
<i>Gustavo Pessin, Fernando S. Osório, Jefferson R. Souza, Fausto G. Costa, Jó Ueyama, Denis F. Wolf, Torsten Braun, and Patrícia A. Vargas</i>	
Employing ANN That Estimate Ozone in a Short-Term Scale When Monitoring Stations Malfunction . . . . .	71
<i>Antonios Papaleonidas and Lazaros Iliadis</i>	
An Ontology Based Approach to Designing Adaptive Lesson Plans in Military Training Simulators . . . . .	81
<i>D. Vijay Rao, Ravi Shankar, Lazaros Iliadis, and V.V.S. Sarma</i>	

A Continuous-Time Model of Analogue K-Winners-Take-All Neural Circuit . . . . .	94
<i>Pavlo V. Tymoshchuk</i>	
Network Intrusion Detection System Using Data Mining . . . . .	104
<i>Lídio Mauro Lima de Campos, Roberto Célio Limão de Oliveira, and Mauro Roisenberg</i>	
A Near Linear Algorithm for Testing Linear Separability in Two Dimensions . . . . .	114
<i>Sylvain Contassot-Vivier and David Elizondo</i>	
A Training Algorithm for Locally Recurrent NN Based on Explicit Gradient of Error in Fault Detection Problems . . . . .	125
<i>Sara Carcangiu, Augusto Montisci, and Patrizia Boi</i>	
Measurement Correction for Multiple Sensors Using Modified Autoassociative Neural Networks . . . . .	135
<i>Javier Reyes Sanchez, Marley Vellasco, and Ricardo Tanscheit</i>	
Visual Based Contour Detection by Using the Improved Short Path Finding . . . . .	145
<i>Jiawei Xu and Shigang Yue</i>	
Analysis of Electricity Consumption Profiles by Means of Dimensionality Reduction Techniques . . . . .	152
<i>Antonio Morán, Juan J. Fuertes, Miguel A. Prada, Serafín Alonso, Pablo Barrientos, and Ignacio Díaz</i>	
Neural Networks for the Analysis of Mine-Induced Vibrations Transmission from Ground to Building Foundation . . . . .	162
<i>Krystyna Kuzniar and Lukasz Chudyba</i>	
Backpropagation Neural Network Applications for a Welding Process Control Problem . . . . .	172
<i>Annan Aktepe, Süleyman Ersöz, and Murat Lüy</i>	
Elastic Nets for Detection of Up-Regulated Genes in Microarrays . . . . .	183
<i>Marcos Levano and Alejandro Mellado</i>	
Detection and Classification of ECG Chaotic Components Using ANN Trained by Specially Simulated Data . . . . .	193
<i>Polina Kurtser, Ofer Levi, and Vladimir Gontar</i>	
Automatic Landmark Location for Analysis of Cardiac MRI Images . . . . .	203
<i>Chrisina Jayne, Andreas Lanitis, and Chris Christodoulou</i>	
Learning of Spatio-temporal Dynamics in Thermal Engineering . . . . .	213
<i>Matthias De Lozzo, Patricia Klotz, and Béatrice Laurent</i>	

Neural Adaptive Control in Application Service Management Environment .....	223
<i>Tomasz Sikora and George D. Magoulas</i>	
Using Varying Negative Examples to Improve Computational Predictions of Transcription Factor Binding Sites .....	234
<i>Faisal Rezwan, Yi Sun, Neil Davey, Rod Adams, Alistair G. Rust, and Mark Robinson</i>	
Visual Analysis of a Cold Rolling Process Using Data-Based Modeling .....	244
<i>Daniel Pérez, Francisco J. García-Fernández, Ignacio Díaz, Abel A. Cuadrado, Daniel G. Ordóñez, Alberto B. Díez, and Manuel Domínguez</i>	
Wind Power Forecasting to Minimize the Effects of Overproduction ....	254
<i>Fernando Ribeiro, Paulo Salgado, and João Barreira</i>	
Using RISE Observer to Implement Patchy Neural Network for the Identification of “Wing Rock” Phenomenon on Slender Delta 80 <sup>0</sup> Wings .....	264
<i>Paraskevas M. Chavatzopoulos, Thomas Giotis, Manolis Christodoulou, and Haris Psillakis</i>	
Models Based on Neural Networks and Neuro-Fuzzy Systems for Wind Power Prediction Using Wavelet Transform as Data Preprocessing Method .....	272
<i>Ronaldo R.B. de Aquino, Hugo T.V. Gouveia, Milde M.S. Lira, Aida A. Ferreira, Otoni Nobrega Neto, and Manoel A. Carvalho Jr.</i>	
Neural Networks for Air Data Estimation: Test of Neural Network Simulating Real Flight Instruments .....	282
<i>Manuela Battipede, Piero Gili, and Angelo Lerro</i>	
Direct Zero-Norm Minimization for Neural Network Pruning and Training .....	295
<i>S.P. Adam, George D. Magoulas, and M.N. Vrahatis</i>	
3D Vision-Based Autonomous Navigation System Using ANN and Kinect Sensor .....	305
<i>Daniel Sales, Diogo Correa, Fernando S. Osório, and Denis F. Wolf</i>	
Hybrid Computational Model for Producing English Past Tense Verbs.....	315
<i>Maitrei Kohli, George D. Magoulas, and Michael Thomas</i>	
Characterizing Mobile Network Daily Traffic Patterns by 1-Dimensional SOM and Clustering .....	325
<i>Pekka Kumpulainen and Kimmo Hätönen</i>	

Dipolar Designing Layers of Formal Neurons .....	334
<i>Leon Bobrowski</i>	
Evaluating the Impact of Categorical Data Encoding and Scaling on Neural Network Classification Performance: The Case of Repeat Consumption of Identical Cultural Goods .....	343
<i>Elena Fitkov-Norris, Samireh Vahid, and Chris Hand</i>	
A Hybrid Neural Emotion Recogniser for Human-Robotic Agent Interaction .....	353
<i>Alexandru Traista and Mark Elshaw</i>	
Ambient Intelligent Monitoring of Dementia Suffers Using Unsupervised Neural Networks and Weighted Rule Based Summarisation .....	363
<i>Faiyaz Doctor, Chrisina Jayne, and Rahat Iqbal</i>	
On the Intelligent Machine Learning in Three Dimensional Space and Applications.....	375
<i>Bipin K. Tripathi and Prem K. Kalra</i>	
Knowledge Clustering Using a Neural Network in a Course on Medical-Surgical Nursing .....	385
<i>José Luis Fernández-Alemán, Chrisina Jayne, Ana Belén Sánchez García, Juan M. Carrillo-de-Gea, and Ambrosio Toval Alvarez</i>	
A New Approach in Stability Analysis of Hopfield-Type Neural Networks: Almost Stability .....	395
<i>Kaiming Wang</i>	
A Double Layer Dementia Diagnosis System Using Machine Learning Techniques .....	402
<i>Po-Chuan Cho and Wen-Hui Chen</i>	

**Workshop on Applying Computational Intelligence  
Techniques in Financial Time Series Forecasting and  
Trading**

A Hybrid Radial Basis Function and Particle Swarm Optimization Neural Network Approach in Forecasting the EUR/GBP Exchange Rates Returns .....	413
<i>Georgios Sermpinis, Konstantinos Theofilatos, Andreas Karathanasopoulos, Efstratios Georgopoulos, and Christian Dunis</i>	
Forecasting and Trading the High-Low Range of Stocks and ETFs with Neural Networks .....	423
<i>Hans-Jörg von Mettenheim and Michael H. Breitner</i>	

Kalman Filters and Neural Networks in Forecasting and Trading . . . . .	433
<i>Georgios Sermpinis, Christian Dunis, Jason Laws, and Charalampos Stasinakis</i>	

Short-Term Trading Performance of Spot Freight Rates and Derivatives in the Tanker Shipping Market: Do Neural Networks Provide Suitable Results? . . . . .	443
<i>Christian von Spreckelsen, Hans-Jörg von Mettenheim, and Michael H. Breitner</i>	

Modelling and Trading the DJIA Financial Index Using Neural Networks Optimized with Adaptive Evolutionary Algorithms . . . . .	453
<i>Konstantinos Theofilatos, Andreas Karathanasopoulos, Georgios Sermpinis, Thomas Amorgianiotis, Efstratios Georgopoulos, and Spiros Likothanassis</i>	

## **Workshop on Computational Intelligence Applications in Bioinformatic**

Applying Kernel Methods on Protein Complexes Detection Problem . . . . .	463
<i>Charalampos Moschopoulos, Griet Laenen, George Kritikos, and Yves Moreau</i>	

Efficient Computational Prediction and Scoring of Human Protein-Protein Interactions Using a Novel Gene Expression Programming Methodology . . . . .	472
<i>Konstantinos Theofilatos, Christos Dimitrakopoulos, Maria Antoniou, Efstratios Georgopoulos, Stergios Papadimitriou, Spiros Likothanassis, and Seferina Mavroudi</i>	

Biomedical Color Image Segmentation through Precise Seed Selection in Fuzzy Clustering . . . . .	482
<i>Byomkesh Mandal and Balaram Bhattacharyya</i>	

<b>Author Index</b> . . . . .	493
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