Table of Contents, Part II

Bio-inspired Systems and Engineering

From Embryonics to POEtic Machines ................................................. 1
D. Mange, A. Stauffer, G. Tempesti, and C. Teuscher

Design and Codesign of Neuro-Fuzzy Hardware .......................... 14
L.M. Reyneri

A Field-Programmable Conductance Array IC
for Biological Neurons Modeling .................................................... 31
V. Douence, S. Renaud-Le Masson, S. Saighi, and G. Le Masson

A 2-by-n Hybrid Cellular Automaton Implementation
Using a Bio-Inspired FPGA ............................................................. 39
H.F. Restrepo and D. Mange

Parametric Neurocontroller for Positioning of an Anthropomorphic Finger
Based on an Oponent Driven-Tendon Transmission System ........ 47
J.I. Mutero, J. Feliú Batlle, and J. López Coronado

An Integration Principle for Multimodal Sensor Data Based
on Temporal Coherence of Self-Organized Patterns .................. 55
E.I. Barakova

Simultaneous Parallel Processing of Object and Position
by Temporal Correlation ................................................................. 64
L.F. Lago-Fernández and G. Deco

Methodology for Nets Design, Nets Simulation
and Implementation

NeuSim: A Modular Neural Networks Simulator for Beowulf Clusters .. 72
C.J. García Orellana, R. Gallardo Caballero,
H.M. González Velasco, F.J. López Aligué

Curved Kernel Neural Network for Functions Approximation .......... 80
P. Bouret and B. Pelletier

Repeated Measures Multiple Comparison Procedures Applied
to Model Selection in Neural Networks ................................. 88
E. Guerrero Vázquez, A. Yañez Escolano, P. Galindo Roaño,
J. Pizarro Junquera
XII Table of Contents, Part II

Extension of HUMANN for Dealing with Noise and with Classes of Different Shape and Size: A Parametric Study ....................... 96
  P. García Báez, C.P. Suárez Araujo, and P. Fernández López

Evenet 2000: Designing and Training Arbitrary Neural Networks in Java .. 104
  E.J. González, A.F. Hamilton, L. Moreno, J.F. Sigut,
  and R.L. Marichal

Neyman-Pearson Neural Detectors .................................. 111
  D. Andina and J.L. Sanz-González

Distance between Kohonen Classes Visualization Tool to Use SOM in Data Set Analysis and Representation ...................... 119
  P. Roussel and C. Gainot

Optimal Genetic Representation of Complete Strictly-Layered Feedforward Neural Networks ..................... 127
  S. Raptis, S. Tzafestas, and H. Karagianni

Assessing the Noise Immunity of Radial Basis Function Neural Networks .. 136
  J.L. Bernier, J. González, A. Cañas, and J. Ortega

Analyzing Boltzmann Machine Parameters for Fast Convergence ...... 144
  F.J. Salcedo, J. Ortega, and A. Prieto

A Penalization Criterion Based on Noise Behaviour for Model Selection ... 152
  J. Pizarro Junquera, P. Galindo Riaño, E. Guerrero Vázquez,
  and A. Yañez Escolano

Image Processing

Wood Texture Analysis by Combining the Connected Elements Histogram and Artificial Neural Networks ......................... 160
  M.A. Patricio Guisado and D. Maravall Gómez-Allende

Dynamic Topology Networks for Colour Image Compression ............ 168
  E. López-Rubio, J. Muñoz-Pérez, and J.A. Gómez-Ruiz

Analysis on the Viewpoint Dependency in 3-D Object Recognition by Support Vector Machines ..................................... 176
  T. Hayasaka, E. Ohnishi, S. Nakauchi, and S. Usui

A Comparative Study of Two Neural Models for Cloud Screening of Iberian Peninsula Meteosat Images ......................... 184
  M. Macías Macías, F.J. López Aligué, A. Serrano Pérez,
  and A. Astilleros Vivas
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Growing Cell Neural Network Structure for Off-Line Signature Recognition</td>
<td>192</td>
</tr>
<tr>
<td>K. Toscano-Medina, G. Sanchez-Perez, M. Nakano-Miyatake, and H. Perez-Meana</td>
<td></td>
</tr>
<tr>
<td>ZISC-036 Neuro-processor Based Image Processing</td>
<td>200</td>
</tr>
<tr>
<td>K. Madani, G. de Trémiolles, and P. Tannhof</td>
<td></td>
</tr>
<tr>
<td>Self-Organizing Map for Hyperspectral Image Analysis</td>
<td>208</td>
</tr>
<tr>
<td>P. Martínez, P.L. Aguilar, R.M. Pérez, M. Linaje, J.C. Preciado, and A. Plaza</td>
<td></td>
</tr>
<tr>
<td>Classification of the Images of Gene Expression Patterns</td>
<td>219</td>
</tr>
<tr>
<td>Using Neural Networks Based on Multi-valued Neurons</td>
<td></td>
</tr>
<tr>
<td>I. Aizenberg, E. Myasnikova, and M. Samsonova</td>
<td></td>
</tr>
<tr>
<td>Image Restoration Using Neural Networks</td>
<td>227</td>
</tr>
<tr>
<td>S. Ghennam and K. Bennmahammed</td>
<td></td>
</tr>
<tr>
<td>Automatic Generation of Digital Filters by NN Based Learning:</td>
<td>235</td>
</tr>
<tr>
<td>An Application on Paper Pulp Inspection</td>
<td></td>
</tr>
<tr>
<td>P. Campoy-Cervera, D.F. Muñoz García, D. Peña, and J.A. Calderón-Martínez</td>
<td></td>
</tr>
<tr>
<td>Image Quality Enhancement for Liquid Bridge Parameter Estimation</td>
<td>246</td>
</tr>
<tr>
<td>with DTCNN</td>
<td></td>
</tr>
<tr>
<td>M.A. Jaramillo, J. Álvaro Fernández, J.M. Montanero, and F. Zayas</td>
<td></td>
</tr>
<tr>
<td>Neural Network Based on Multi-valued Neurons: Application</td>
<td>254</td>
</tr>
<tr>
<td>in Image Recognition, Type of Blur and Blur Parameters Identification</td>
<td></td>
</tr>
<tr>
<td>I. Aizenberg, N. Aizenberg, and C. Butakoff</td>
<td></td>
</tr>
<tr>
<td>Analyzing Wavelets Components to Perform Face Recognition</td>
<td>262</td>
</tr>
<tr>
<td>P. Isasi, M. Velasco, and J. Segovia</td>
<td></td>
</tr>
<tr>
<td>Man-Machine Voice Interface</td>
<td>271</td>
</tr>
<tr>
<td>Using a Commercially Available Neural Chip</td>
<td></td>
</tr>
<tr>
<td>N.J. Medraño-Marqués and B. Martín-del-Brío</td>
<td></td>
</tr>
<tr>
<td>Partial Classification in Speech Recognition Verification</td>
<td>279</td>
</tr>
<tr>
<td>G. Hernández Ábrego and I. Torres Sánchez</td>
<td></td>
</tr>
<tr>
<td>Speaker Recognition Using Gaussian Mixtures Model</td>
<td>287</td>
</tr>
<tr>
<td>E. Simancas-Acevedo, A. Kurematsu, M. Nakano Miyatake, and H. Perez-Meana</td>
<td></td>
</tr>
<tr>
<td>A Comparative Study of ICA Filter Structures Learnt from Natural and Urban Images</td>
<td>295</td>
</tr>
<tr>
<td>C. Ziegaus and E.W. Lang</td>
<td></td>
</tr>
</tbody>
</table>
Neural Edge Detector –
A Good Mimic of Conventional One Yet Robuster against Noise ........ 303
K. Suzuki, I. Horiba, and N. Sugie

Neural Networks for Image Restoration from the Magnitude
of Its Fourier Transform ............................................. 311
A. Burian, J. Saarinen, and P. Kuosmanen

Medical Applications

An Automatic System for the Location of the Optic Nerve Head
from 2D Images .......................................................... 319
M. Bachiller, M. Rincón, J. Mira, and J. García-Feijó

Can ICA Help Classify Skin Cancer and Benign Lesions? ................. 328
C. Mies, C. Bauer, G. Ackermann, W. Bäuml, C. Abels,
C.G. Puntonet, M. Rodríguez-Alvarez, and E.W. Lang

An Approach Fractal and Analysis of Variogram for Edge Detection
of Biomedical Images .................................................. 336
L. Hamami and N. Lassouaoui

Some Examples for Solving Clinical Problems Using Neural Networks. ... 345
A.J. Serrano, E. Soria, G. Camps, J.D. Martín, and N.V. Jiménez

Medical Images Analysis: An Application of Artificial Neural Networks
in the Diagnosis of Human Tissues .................................... 353
E. Restum Antonio, L. Biondi Neto, V. De Roberto Junior,
and F. Hideo Fukuda

Feature Selection, Ranking of Each Feature and Classification
for the Diagnosis of Community Acquired Legionella Pneumonia ........ 361
E. Monte, J. Solé i Casals, J.A. Fiz, and N. Sopena

Rotation-Invariant Image Association for Endoscopic Positional
Identification Using Complex-Valued Associative Memories ............... 369
H. Aoki, E. Watanabe, A. Nagata, and Y. Kosugi

A Multi Layer Perceptron Approach for Predicting and Modeling
the Dynamical Behavior of Cardiac Ventricular Repolarisation .......... 377
R. El Dajani, M. Miquel, and P. Rubel

Detection of Microcalcifications in Mammograms by the Combination
of a Neural Detector and Multiscale Feature Enhancement .............. 385
D. Andina and A. Vega-Corona
An Auto-learning System for the Classification of Fetal Heart Rate Decelerative Patterns ................................................. 393
B. Guijarro Berdiñas, A. Alonso-Betanzos, O. Fontenla-Romero, O. García-Dans, and N. Sánchez Maroño

Neuro-Fuzzy Nets in Medical Diagnosis: The DIAGEN Case Study of Glaucoma ................................................................. 401
E. Carmona, J. Mira, J. García Peijó, and M.G. de la Rosa

Robotics

Evolving Brain Structures for Robot Control ............................................. 410
F. Pasemann, U. Steinmetz, M. Hülse, and B. Lara

A Cuneate-Based Network and Its Application as a Spatio-Temporal Filter in Mobile Robotics ................................................. 418
E. Sánchez, M. Mucientes, and S. Barro

An Application of Fuzzy State Automata: Motion Control of an Hexapod Walking Machine ................................................. 426
D. Morano and L.M. Reyneri

Neural Adaptive Force Control for Compliant Robots ............................. 436
N. Saadia, Y. Amirat, J. Pontnaut, and A. Ramdane-Cherif

Reactive Navigation Using Reinforcement Learning Techniques in Situations of POMDPs .......................................................... 444
P. Puliti, G. Tascini, and A. Montesanto

Landmark Recognition for Autonomous Navigation Using Odometric Information and a Network of Perceptrons ................. 451
J. de Lope Asiaín and D. Maravall Gómez-Allende

F. de la Paz López, and J.R. Álvarez-Sánchez

Information Integration for Robot Learning Using Neural Fuzzy Systems 468
C. Zhou, Y. Yang, and J. Kanniah

Incorporating Perception-Based Information in Reinforcement Learning Using Computing with Words ................................. 476
C. Zhou, Y. Yang, and X. Jia

Cellular Neural Networks for Mobile Robot Vision ................................. 484
M. Balsi, A. Maraschini, G. Apicella, S. Luengo, J. Solsona, and X. Vilasís-Cardona

Learning to Predict Variable-Delay Rewards and Its Role in Autonomous Developmental Robotics .............................................. 492
A. Pérez-Uribe and M. Courant
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust Chromatic Identification and Tracking</td>
<td>500</td>
</tr>
<tr>
<td>J. Ramírez and G. Grittani</td>
<td></td>
</tr>
<tr>
<td>Sequence Learning in Mobile Robots Using Avalanche Neural Networks</td>
<td>508</td>
</tr>
<tr>
<td>G. Quero and C. Chang</td>
<td></td>
</tr>
<tr>
<td>Investigating Active Pattern Recognition in an Imitative Game</td>
<td>516</td>
</tr>
<tr>
<td>S. Moga, P. Gaussier, and M. Quoy</td>
<td></td>
</tr>
<tr>
<td>Towards an On-Line Neural Conditioning Model for Mobile Robots</td>
<td>524</td>
</tr>
<tr>
<td>E. Şahin</td>
<td></td>
</tr>
<tr>
<td><strong>General Applications</strong></td>
<td></td>
</tr>
<tr>
<td>A Thermocouple Model Based on Neural Networks</td>
<td>531</td>
</tr>
<tr>
<td>N. Medrán-Marqués, R. del-Hoyo-Alonso, and B. Martín-del-Brió</td>
<td></td>
</tr>
<tr>
<td>Improving Biological Sequence Property Distances</td>
<td>539</td>
</tr>
<tr>
<td>Using a Genetic Algorithm</td>
<td></td>
</tr>
<tr>
<td>O.M. Perez, F.J. Marin, and O. Treles</td>
<td></td>
</tr>
<tr>
<td>Data Mining Applied to Irrigation Water Management</td>
<td>547</td>
</tr>
<tr>
<td>J.A. Botía, A.F. Gómez Skarmeta, M. Valdés, and A. Padilla</td>
<td></td>
</tr>
<tr>
<td>Classification of Specular Object Based on Statistical Learning Theory</td>
<td>555</td>
</tr>
<tr>
<td>T.S. Yun</td>
<td></td>
</tr>
<tr>
<td>On the Application of Heteroassociative Morphological Memories</td>
<td>563</td>
</tr>
<tr>
<td>to Face Localization</td>
<td></td>
</tr>
<tr>
<td>B. Raducanu and M. Graña</td>
<td></td>
</tr>
<tr>
<td>Early Detection and Diagnosis of Faults in an AC Motor</td>
<td>571</td>
</tr>
<tr>
<td>Using Neuro Fuzzy Techniques: FasArt+ Fuzzy k Nearest Neighbors</td>
<td></td>
</tr>
<tr>
<td>J. Juez, G.I. Sainz, E.J. Moya, and J.R. Perán</td>
<td></td>
</tr>
<tr>
<td>Knowledge-Based Neural Networks for Modelling Time Series</td>
<td>579</td>
</tr>
<tr>
<td>J. van Zyl and C.W. Omlin</td>
<td></td>
</tr>
<tr>
<td>Using Artificial Neural Network to Define Fuzzy Comparators</td>
<td>587</td>
</tr>
<tr>
<td>in FSQI with the Criterion of Some Decision-Maker</td>
<td></td>
</tr>
<tr>
<td>R. Carrasco, J. Galindo, and A. Vila</td>
<td></td>
</tr>
<tr>
<td>Predictive Classification for Integrated Pest Management by Clustering</td>
<td>595</td>
</tr>
<tr>
<td>in NN Output Space</td>
<td></td>
</tr>
<tr>
<td>M. Salmerón, D. Guidotti, R. Petacchi, and L.M. Regneri</td>
<td></td>
</tr>
<tr>
<td>Blind Source Separation in the Frequency Domain: A Novel Solution to</td>
<td>603</td>
</tr>
<tr>
<td>the Amplitude and the Permutation Indeterminacies</td>
<td></td>
</tr>
<tr>
<td>A. Dapena and L. Castedo</td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents, Part II  XVII

Evaluation, Classification and Clustering with Neuro-Fuzzy Techniques in Integrate Pest Management .................................................. 611
   E. Bellei, D. Guidotti, R. Petacchi, L.M. Reyneri, and I. Rizzi

Inaccessible Parameters Monitoring in Industrial Environment:
A Neural Based Approach ...................................................... 619
   K. Madani and I. Berechet

Autoorganized Structures for Extraction of Perceptual Primitives ........ 628
   M. Penas, M.J. Carreira, and M.G. Penedo

Real-Time Wavelet Transform for Image Processing
on the Cellular Neural Network Universal Machine ...................... 636
   V.M. Preciado

OBLIC: Classification System Using Evolutionary Algorithm ............ 644
   J.L. Alvarez, J. Mata, and J.C. Riquelme

Design of a Pre-processing Stage for Avoiding the Dependence
on TSNR of a Neural Radar Detector ....................................... 652
   P. Jarabo Amores, M. Rosa Zurera, and F. López Ferreras

Foetal Age and Weight Determination
Using a Lateral Interaction Inspired Net .................................... 660
   A. Fernández-Caballero, J. Mira, F.J. Gómez, and M.A. Fernández

Inference of Stochastic Regular Languages
through Simple Recurrent Networks with Time Dealys .................. 671
   G.A. Casañ and M.A. Castaño

Is Neural Network a Reliable Forecaster on Earth? A MARS Query! .... 679
   A. Abraham and D. Steinberg

Character Feature Extraction Using Polygonal Projection Sweep
(Contour Detection) ................................................................ 687
   R.J. Rodrigues, G.K. Vianna, and A.C.G. Thomé

Using Contextual Information
to Selectively Adjust Preprocessing Parameters .......................... 696
   P. Neskoetic and L.N. Cooper

Electric Power System’s Stability Assessment and Online-Provision
of Control Actions Using Self-Organizing Maps ............................ 704
   C. Leder and C. Rehtanz

Neural Networks for Contingency Evaluation and Monitoring
in Power Systems ................................................................. 711
   F. García-Lagos, G. Joya, F.J. Marín, and F. Sandoval
Hybrid Framework for Neuro-dynamic Programming Application to Water Supply Networks ......................... 719
  M. Damas, M. Salmerón, J. Ortega, and G. Olivares

Classification of Disturbances in Electrical Signals Using Neural Networks ................................. 728
  C. León, A. López, J.C. Montaño, and Í. Monedero

Neural Classification and “Traditional” Data Analysis: An Application to Households’ Living Conditions ......................... 738
  S. Ponthieux and M. Cottrell

Nonlinear Synthesis of Vowels in the LP Residual Domain with a Regularized RBF Network ......................... 746
  E. Rank and G. Kabin

Nonlinear Vectorial Prediction with Neural Nets .......................... 754
  M. Fainidez-Zanuy

Separation of Sources Based on the Partitioning of the Space of Observations ................................. 762
  M. Rodríguez-Álvarez, C.G. Puntonet, and I. Rojas

Adaptive ICA with Order Statistics in Multidimensional Scenarios ......................... 770
  Y. Blanco, S. Zazo, and J.M. Paez-Borrullo

Pattern Repulsion Revisited .................................... 778
  Fabian J. Theis, C. Bauer, C. Puntonet, and E.W. Lang

The Minimum Entropy and Cumulants Based Contrast Functions for Blind Source Extraction ......................... 786
  S. Cruces, A. Cichocki, and S.-I. Amari

Feature Extraction in Digital Mammography:
An Independent Component Analysis Approach ......................... 794
  A. Koutras, I. Christoyianni, E. Dermatas, and G. Kokkinakis

Blind Source Separation in Convolutional Mixtures:
A Hybrid Approach for Colored Sources ......................... 802
  F. Abrard and Y. Deville

A Conjugate Gradient Method and Simulated Annealing
for Blind Separation of Sources .......................... 810
  R. Martín-Clemente, C.G. Puntonet, and J.I. Acha

The Problem of Overlearning in High-Order ICA Approaches:
Analysis and Solutions ......................... 818
  J. Särelä and R. Vigário
Equi-convergence Algorithm for Blind Separation of Sources with Arbitrary Distributions ........................................ 826
   L.-Q. Zhang, S. Amari, and A. Cichocki

Separating Convolutive Mixtures by Mutual Information Minimization . . . 834
   M. Babaie-Zadeh, C. Jutten, and K. Nayebi

Author Index .......................................................... 843
## Table of Contents, Part I

### Foundations of Connectionism and Biophysical Models of Neurons

**Dendrites: The Last-Generation Computers**

*O. Herreras, J.M. Ibarz, L. López-Aguado, and P. Varona*

1

**Homogeneity in the Electrical Activity Pattern as a Function of Intercellular Coupling in Cell Networks**

*E. Andreu, R. Pomares, B. Soria, and J.V. Sanchez-Andres*

14

**A Realistic Computational Model of the Local Circuitry of the Cuneate Nucleus**

*E. Sánchez, S. Barro, J. Mariño, and A. Canedo*

21

**Algorithmic Extraction of Morphological Statistics from Electronic Archives of Neuroanatomy**

*R. Scorcioni and G.A. Ascoli*

30

**What Can We Compute with Lateral Inhibition Circuits?**

*J. Mira and A.E. Delgado*

38

**Neuronal Models with Current Inputs**

*J. Feng*

47

**Decoding the Population Responses of Retinal Ganglions Cells Using Information Theory**

*J.M. Ferrández, M. Bongard, F. García de Quirós, J.A. Bolea, J. Ammermüller, R.A. Normann, and E. Fernández*

55

**Numerical Study of Effects of Co-transmission by Substance P and Acetylcholine on Synaptic Plasticity in Myenteric Neurons**

*R. Miľatov and J. Christensen*

63

**Neurobiological Modeling of Bursting Response During Visual Attention**

*R. Rajimehr and L. Montaser Kouhsari*

72

**Sensitivity of Simulated Striate Neurons to Cross-Like Stimuli Based on Disinhibitory Mechanism**

*K.A. Saltykov and I.A. Shevelev*

81

**Synchronisation Mechanisms in Neuronal Networks**

*S. Chillemi, M. Barbi, and A. Di Garbo*

87
### Table of Contents, Part I

Detection of Oriented Repetitive Alternating Patterns in Color Images  
(A Computational Model of Monkey Grating Cells) .......................... 95  
* T. Lourens, H.G. Okuno, and H. Kitano  

Synchronization in Brain – Assessment by Electroencephalographic Signals 108  
* E. Pereda and J. Bhattacharya  

Strategies for the Optimization of Large Scale Networks of Integrate and Fire Neurons ................................................................. 117  
* M.A. Sánchez-Montañés  

#### Structural and Functional Models of Neurons

A Neural Network Model of Working Memory  
(Processing of “What” and “Where” Information) ......................... 126  
* T. Minami and T. Inui  

Orientation Selectivity of Intracortical Inhibitory Cells in the Striate Visual Cortex: A Computational Theory and a Neural Circuitry ........ 134  
* M.N. Shirazi  

Interpreting Neural Networks in the Frame of the Logic of Lukasiewicz ... 142  
* C. Moraga and L. Salinas  

Time-Dispersive Effects in the J. Gonzalo’s Research on Cerebral Dynamics ................................................................. 150  
* I. Gonzalo and M.A. Porras  

Verifying Properties of Neural Networks ........................................ 158  
* P. Rodrigues, J.F. Costa, and H.T. Siegelmann  

Algorithms and Implementation Architectures for Hebbian Neural Networks ................................................................. 166  
* J.A. Berzal and P.J. Zufiria  

The Hierarchical Neuro-Fuzzy BSP Model: An Application in Electric Load Forecasting ......................................................... 174  
* F.J. de Souza, M.M.R. Vellasco, and M.A.C. Pacheco  

The Chemical Metaphor in Neural Computation ............................. 184  
* J. Barahona da Fonseca, I. Barahona da Fonseca,  
  C.P. Suárez Araujo, and J. Simões da Fonseca  

The General Neural-Network Paradigm for Visual Cryptography ........ 196  
* T.-W. Yue and S. Chiang
Table of Contents, Part I

II-DTB, Discrete Time Backpropagation with Product Units .................. 207
  J. Santos and R. J. Duro

Neocognitron-Type Network for Recognizing Rotated and Shifted Patterns with Reduction of Resources ...................................................... 215
  S. Satoh, S. Miyake, and H. Aso

Classification with Synaptic Radial Basis Units .............................. 223
  J. D. Buldain

A Randomized Hypercolumn Model and Gesture Recognition ............... 235
  N. Tsuruta, Y. Yoshiki, and T. El. Tobely

Heterogeneous Kohonen Networks .................................................. 243
  S. Negri, L. A. Belanche

Divided-Data Analysis in a Financial Case Classification with Multi-dendritic Neural Networks ...................................................... 253
  J. D. Buldain

  A. Abraham

Generating Linear Regression Rules from Neural Networks Using Local Least Squares Approximation .................................................. 277
  R. Setiono

Speech Recognition Using Fuzzy Second-Order Recurrent Neural Networks ................................................................. 285
  A. Blanco, M. Delgado, M. C. Pegalajar, and I. Requena

A Measure of Noise Immunity for Functional Networks ...................... 293
  E. Castillo, O. Fontenla-Romero, B. Guijarro-Berdiñas, and A. Alonso-Betanzos

A Functional-Neural Network for Post-Nonlinear Independent Component Analysis ................................................................. 301
  O. Fontenla Romero, B. Guijarro Berdiñas, and A. Alonso Betanzos

Optimal Modular Feedfoward Neural Nets Based on Functional Network Architectures ................................................................. 308
  A. S. Cofino, J. M. Gutiérrez

Optimal Transformations in Multiple Linear Regression Using Functional Networks ................................................................. 316
  E. Castillo, A. S. Hadi, and B. Lacruz
# Learning and Other Plasticity Phenomena, and Complex Systems Dynamics

- Generalization Error and Training Error at Singularities of Multilayer Perceptrons  
  
  S.-I. Amari, T. Ozeki, and H. Park

- Bistable Gradient Neural Networks: Their Computational Properties  
  
  V. Chinarov and M. Menzinger

- Inductive Bias in Recurrent Neural Networks  
  
  S. Snyders and C.W. Omlin

- Accelerating the Convergence of EM-Based Training Algorithms for RBF Networks  
  
  M. Lázaro, I. Santamaría, and C. Pantaleón

- Expansive and Competitive Neural Networks  
  
  J.A. Gomez-Ruiz, J. Muñoz-Perez, E. López-Rubio, and M.A. García-Bernal

- Fast Function Approximation with Hierarchical Neural Networks and Their Application to a Reinforcement Learning Agent  
  
  J. Fischer, R. Breithaupt, and M. Bode

- Two Dimensional Evaluation Reinforcement Learning  
  
  H. Okada, H. Yamakawa, and T. Omori

- Comparing the Learning Processes of Cognitive Distance Learning and Search Based Agent  
  
  H. Yamakawa, Y. Miyamoto, and H. Okada

- Selective Learning for Multilayer Feedforward Neural Networks  
  
  A.P. Engelbrecht

- Connectionist Models of Cortico-Basal Ganglia Adaptive Neural Networks During Learning of Motor Sequential Procedures  
  
  J. Molina Vilaplana, J. Feliú Batlle, and J. López Coronado

- Practical Consideration on Generalization Property of Natural Gradient Learning  
  
  H. Park

- Novel Training Algorithm Based on Quadratic Optimisation Using Neural Networks  
  
  G. Arulampalam and A. Bouzerdoum

- Non-symmetric Support Vector Machines  
  
  J. Feng
Natural Gradient Learning in NLDA Networks .......................... 427
  J.R. Dorronsoro, A. González, and C. Santa Cruz

AUTOWISARD: Unsupervised Modes for the WISARD ............. 435
  I. Wickert and F.M.G. França

Neural Steering: Difficult and Impossible Sequential Problems
for Gradient Descent .................................................. 442
  G. Milligan, M.K. Weir, and J.P. Lewis

Analysis of Scaling Exponents of Waken and Sleeping Stage in EEG ...... 450
  J.-M. Lee, D.-J. Kim, I.-Y. Kim, and S.I. Kim

Model Based Predictive Control Using Genetic Algorithms.
Application to Greenhouses Climate Control ........................ 457
  X. Blasco, M. Martínez, J. Senent, and J. Sanchis

Nonlinear Parametric Model Identification with Genetic Algorithms.
Application to a Thermal Process ..................................... 466
  X. Blasco, J.M. Herrero, M. Martínez, and J. Senent

A Comparison of Several Evolutionary Heuristics
for the Frequency Assignment Problem .............................. 474
  C. Cotta and J.M. Troya

GA Techniques Applied to Contour Search in Images of Bovine Livestock . 482
  H.M. González Velasco, C.J. García Orellana,
  M. Macías Macías, and M.I. Acvedo Sotoca

Richer Network Dynamics of Intrinsically Non-regular Neurons Measured
through Mutual Information ............................................ 490
  F. Rodríguez, P. Varona, R. Huerta, M.I. Rabinovich,
  and H.D.I. Abarbanel

RBF Neural Networks, Multiobjective Optimization
and Time Series Forecasting .......................................... 498
  J. González, I. Rojas, H. Pomares, and J. Ortega

Evolving RBF Neural Networks ........................................ 506
  V.M. Rivas, P.A. Castillo, and J.J. Merelo

Evolutionary Cellular Configurations
for Designing Feed-Forward Neural Networks Architectures .......... 514
  G. Gutiérrez, P. Isasi, J.M. Molina, A. Sanchís, and I.M. Galván

A Recurrent Multivalued Neural Network for the N-Queens Problem ...... 522
  E. Mérida, J. Muñoz, and R. Benítez
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Novel Approach to Self-Adaptation of Neuro-Fuzzy Controllers in Real Time</td>
<td>530</td>
</tr>
<tr>
<td>H. Pomares, I. Rojas, J. González, and M. Damas</td>
<td></td>
</tr>
<tr>
<td>Expert Mutation Operators for the Evolution of Radial Basis Function Neural Networks</td>
<td>538</td>
</tr>
<tr>
<td>J. González, I. Rojas, H. Pomares, and M. Salmerón</td>
<td></td>
</tr>
<tr>
<td>Studying Neural Networks of Bifurcating Recursive Processing Elements – Quantitative Methods for Architecture Design and Performance Analysis</td>
<td>546</td>
</tr>
<tr>
<td>E. Del Moral Hernandez</td>
<td></td>
</tr>
<tr>
<td>Topology-Preserving Elastic Nets</td>
<td>554</td>
</tr>
<tr>
<td>V. Tereshko</td>
<td></td>
</tr>
<tr>
<td>Optimization with Linear Constraints in the Neural Network</td>
<td>561</td>
</tr>
<tr>
<td>M. Oota, N. Ishii, K. Yamauchi, and M. Nakamura</td>
<td></td>
</tr>
<tr>
<td>Optimizing RBF Networks with Cooperative/Competitive Evolution of Units and Fuzzy Rules</td>
<td>570</td>
</tr>
<tr>
<td>A.J. Rivera, J. Ortega, I. Rojas, and A. Prieto</td>
<td></td>
</tr>
<tr>
<td>Study of Chaos in a Simple Discrete Recurrence Neural Network</td>
<td>579</td>
</tr>
<tr>
<td>J.D. Piñeiro, R.L. Marichal, L. Moreno, J.F. Sigut, and E.J. González</td>
<td></td>
</tr>
<tr>
<td>Genetic Algorithm versus Scatter Search and Solving Hard MAX-W-SAT Problems</td>
<td>586</td>
</tr>
<tr>
<td>H. Drias</td>
<td></td>
</tr>
<tr>
<td>A New Approach to Evolutionary Computation:</td>
<td></td>
</tr>
<tr>
<td>Segregative Genetic Algorithms (SEGA)</td>
<td>594</td>
</tr>
<tr>
<td>M. Affenzeller</td>
<td></td>
</tr>
<tr>
<td>Evolution of Firms in Complex Worlds: Generalized NK Model</td>
<td>602</td>
</tr>
<tr>
<td>N. Jacoby</td>
<td></td>
</tr>
<tr>
<td>Learning Adaptive Parameters with Restricted Genetic Optimization Method</td>
<td>612</td>
</tr>
<tr>
<td>S. Garrido and L. Moreno</td>
<td></td>
</tr>
<tr>
<td>Solving NP-Complete Problems with Networks of Evolutionary Processors</td>
<td>621</td>
</tr>
<tr>
<td>J. Castellanos, C. Martín-Vide, V. Mitrana, and J.M. Sempere</td>
<td></td>
</tr>
<tr>
<td>Using SOM for Neural Network Visualization</td>
<td>629</td>
</tr>
<tr>
<td>G. Romero, P.A. Castillo, J.J. Merelo, and A. Prieto</td>
<td></td>
</tr>
</tbody>
</table>
## Table of Contents, Part I

Comparison of Supervised Self-Organizing Maps Using Euclidian
or Mahalanobis Distance in Classification Context ................................. 637

*F. Fessant, P. Aknin, L. Oukhellou, and S. Midenet*

Introducing Multi-objective Optimization in Cooperative Coevolution
of Neural Networks ........................................................................... 645

*N. García-Pedrajas, E. Sanz-Tapia, D. Ortiz-Boyer,
and C. Hervás-Martínez*

STAR - Sparsity through Automated Rejection ................................. 653

*R. Burbidge, M. Trotter, B. Buxton, and S. Holden*

Ordinal Regression with K-SVCR Machines ........................................ 661

*C. Angulo and A. Català*

Large Margin Nearest Neighbor Classifiers ........................................ 669

*S. Bermejo and J. Cabestany*

Reduced Support Vector Selection by Linear Programs ..................... 677

*W.A. Fellenz*

Edge Detection in Noisy Images Using the Support Vector Machines ..... 685

*H. Gómez-Moreno, S. Maldonado-Bascón, and F. López Ferreras*

Initialization in Genetic Algorithms for Constraint Satisfaction Problems.. 693

*C.R. Vela, R. Varela, and J. Puente*

Evolving High-Posterior Self-Organizing Maps .................................. 701

*J. Muruzábal*

Using Statistical Techniques to Predict GA Performance ................... 709

*R. Nogueras and C. Cotta*

Multilevel Genetic Algorithm for the Complete Development of ANN ..... 717

*J. Dorado, A. Santos, and J.R. Rabuñal*

Graph Based GP Applied to Dynamical Systems Modeling ................. 725

*A.M. López, H. López, and L. Sánchez*

Nonlinear System Dynamics in the Normalisation Process
of a Self-Organising Neural Network for Combinatorial Optimisation ..... 733

*T. Kwok and K.A. Smith*

Continuous Function Optimisation via Gradient Descent
on a Neural Network Approxmiation Function .............................. 741

*K.A. Smith and J.N.D. Gupta*

An Evolutionary Algorithm for the Design
of Hybrid Fiber Optic-Coaxial Cable Networks in Small Urban Areas ..... 749

*P. Cortés, F. Guerrero, D. Canca, and J.M. García*
Channel Assignment for Mobile Communications
Using Stochastic Chaotic Simulated Annealing ......................... 757
S. Li and L. Wang

**Artificial Intelligence and Cognitive Processes**

Seeing is Believing: Depictive Neuromodelling of Visual Awareness ...... 765
I. Aleksander, H. Morton, and B. Dunmall

DIAGEN-WebDB: A Connectionist Approach
to Medical Knowledge Representation and Inference .................... 772
J. Mira, R. Martínez, J.R. Álvarez, and A.E. Delgado

Conceptual Spaces as Voltage Maps .................................... 783
J. Aisbett and G. Gibbon

Determining Hyper-planes to Generate Symbolic Rules ................. 791
G. Bologna

Automatic Symbolic Modelling of Co-evolutionarily Learned Robot Skills . 799
A. Ledezma, A. Berlanga, and R. Aler

ANNs and the Neural Basis for General Intelligence ..................... 807
J.G. Wallace and K. Bluff

Knowledge and Intelligence .............................................. 814
J.C. Herrero

Conjecturing the Cognitive Plausibility of an ANN Theorem-Prover ...... 822
I.M.O. Vilela and P.M.V. Lima

**Author Index** .......................................................... 831
Bio-Inspired Applications of Connectionism
Mira, J.; Prieto, A. (Eds.)
2001, LIV, 852 p., Softcover
ISBN: 978-3-540-42237-2