

Contents

1. Neural Network Theories, Neural Models

Cooperative Computing and Neural Networks P.A. Ligomenides	1
Neural Net's Theory - The Specifications of a Computational Model of Memory and Information Processing in Decision-Making J. Mira, R. Moreno-Diaz, J. Simões da Fonseca	11
Chaotic Neural Networks and Associative Memory T. Ikeguchi, M. Adachi, K. Aihara	17
Nonequilibrium Model of Neural Networks P.L. Garrido, J. Marro	25
A Modified Algorithm for Self-Organizing Maps Based on the Schrödinger Equation V. Tryba, K. Goser	33
Neural Network Modelling by Means of Networks of Finite Automata C. Kemke	48
Adaptive Optimization of Neural Algorithms C. Jutten, A. Guerin, H.L. Nguyen Thi	54
Neural Networks with Hysteresis Type of Nonlinearity Exhibit Global Optimization Property J. Levendovszky, W. Mommaerts, E.C. van der Meulen	62
Stability Measurement Criterion for Neural Networks of Competitive Learning A. Sacristán, E. Valderrama, C. Pérez-Vicente	69
On the Power of Networks of Majority Functions E. Mayoraz	78
Using Quadratic Perceptrons to Reduce Interconnection Density in Multilayer Neural Networks D. Röckmann, C. Moraga	86

2. Biological Perspectives

Always Trying to Write an Equation for the Brain J. Mira, A.E. Delgado	93
Transformation of Control Signals for Saccadic Eye Movements B. Breznen	101

On the Semantics of Morphogenesis in Photoreceptors K.N. Leibovic, R. Moreno-Díaz Jr.	109
Implementing a "Psychophysical" Pattern Classifier in a Decrementing Network J.M. Salinas, V.G. Dobson	116
Contributions of Neural Net's Theory to the Understanding of Psychopathological Productions in Schizophrenia J. Simões da Fonseca, J. Maltez, I. Barahona da Fonseca	124
 3. Neural Network Architectures and Algorithms	
Backpropagation Growing Networks: Towards Local Minima Elimination I. Bellido, G. Fernández	130
Methods for Encoding in Multilayer Feed-Forward Neural Networks E. Elizalde, S. Gómez, A. Romeo	136
Learning Algorithm for Feed-Forward Neural Networks with Discrete Synapses C.J. Pérez Vicente, J. Carrabina, F. Garrido, E. Valderrama	144
Synthesis of Adaptive Memories with Neural Networks F.J. López Aliqué, M.I. Acevedo Sotoca, M.A. Jaramillo Moran	153
Minimally Disturbance Learning V. Ruiz de Angulo, C. Torras	162
Fuzzy-Neunet: A Non Standard Neural Network P. Andlinger, E.R. Reichl	173
Decrementing Hamming and Bayesian Neural Networks: Analog Implementations and Relative Performance V.G. Dobson, J.M. Salinas	181
Dynamic Thresholds and Attractor Neural Networks C. Campbell	189
Use of Genetic Algorithms in Neural Networks Definition F.J. Vico, F. Sandoval	196
Simulated Evolution of Modular Networks J. Fernández Falcón	204
Computational Experiments with Boltzmann Machines A. d' Anjou, M. Graña, M.C. Hernandez, F.J. Torrealdea	212

An Adaptive Resonance Theory Architecture for the Automatic Recognition of on-line Handwritten Symbols of a Mathematical Editor	
Y.A. Dimitriadis, J. López Coronado, J.L. Contreras Vidal	216

4. Software Developments and Tools

An Experimental Design Advisor and Neural Network Analysis Package	
A.J. Owens, M.T. Mocella	227
Extending an Object Oriented Concurrent Logic Language for Neural Network Simulations	
J.M. Troya, J.F. Aldana	235

5. Hardware Implementations

Application and Implementation of Neural Networks in Microelectronics	
K. Goser, U. Hilleringmann, U. Rückert	243
CMOS Implementation of a Cellular Neural Network with Dynamically Alterable Cloning Templates	
M. Anguita, A. Prieto, F.J. Pelayo, J. Ortega, A. Diaz	260
Systolic Implementation of Hopfield Networks of Arbitrary Size	
S. Barro, A. Bugarín, A. Yáñez	268
VLSI Fully Connected Neural Networks for the Implementation of other Topologies	
J. Carrabina, F. Lisa, N. Avellana, C.J. Pérez-Vicente, E. Valderrama	277
Backpropagation Multilayer Perceptron: A Modular Implementation	
A. Yáñez, S. Barro, A. Bugarín	285
Toroidal Neural Network Processor: Multiple Learning Algorithm Support	
S. Jones	296
CMOS Implementation of Synapse Matrices with Programmable Analog Weights	
F.J. Pelayo, B. Pino, A. Prieto, J. Ortega, F.J. Fernandez	307
Analog VLSI Synapse Matrix with Enhanced Stochastic Computations	
M. Verleysen, P. Jespers	315
CMOS Continuous BAM with On Chip Learning	
B. Linares-Barranco, S. Sánchez-Sinencio, A. Rodríguez-Vázquez, J.L. Huertas	322
An Integrated Circuit for Artificial Neural Networks	
F. Castillo, J. Cabestany, J.M. Moreno	328

6. Applications

An Application of Neural Networks to Natural Scene Segmentation M. Vicens, J. Albert, V. Arnau	333
An Approach to Isolated Word Recognition Using Multilayer Perceptrons A. Cañas, J. Ortega, F.J. Fernández, A. Prieto, F.J. Pelayo	340
The Use of Multilayer Perceptrons in Isolated Word Recognition M.J. Castro, F. Casacuberta	348
Continuous Speech Recognition with the Connectionist Viterbi Training Procedure: A Summary of Recent Work M. Franzini, A. Waibel, K.-F. Lee	355
Recurrent Neural Networks for Speech Recognition J.E. Díaz Verdejo, A. Peinado Herreros, J.C. Segura Luna, M.C. Benítez Ortúzar, A. Rubio Ayuso	361
A Speech Recognition System that Integrates Neural Nets and HMM E. Monte, J.B. Mariño	370
Comparison of Neural Networks and Conventional Techniques for Automatic Recognition of a Multilingual Speech Database D. Maravall, J. Ríos, M. Pérez-Castellanos, A. Carpintero, J. Gómez-Calcerrada	377
Optimization Problems on Concurrent Testing Solved by Neural Networks J. Ortega, A. Prieto, F.J. Pelayo, A. Lloris, P. Martín-Smith	385
Application of High-Order Hopfield Neural Networks to the Solution of Diophantine Equations G. Joya, M.A. Atencia, F. Sandoval	395
Self-Organizing Feature Maps and Their Application to Digital Coding of Information A. Cabrera Izquierdo, J. Cid Sueiro, J.A. Hernández Méndez	401
Neural Networks as Error Correcting Systems in Digital Communications I. Ortuño, M. Ortuño, J.A. Delgado	409
Application of Vector Quantization Algorithms to Protein Classification and Secondary Structure Computation J.J. Merelo, M.A. Andrade, C. Ureña, A. Prieto, F. Morán.	415
Application of the LVQ Neural Method to a Stellar Catalogue M. Hernandez-Pajares, E. Monte	422
Neural Network Design for Mobile Robot Control Following a Contour F. Arroyo, A. Gonzalo, L.E. Moreno	430

A Supervisory Technique to Apply Neural Networks in Control	
F. García-Padilla, F. Morant-Anglada	437
Autonomous Controller Tuning by Using a Neural Network	
J. Fernández de Cañete, A. Ollero, M. Díaz-Fondón	445
Neural Networks for Water Demand Time Series Forecasting	
R. Griño Cubero	453
Using Artificial Neural Networks to Aid Decision Making Processes	
J.É. Cano, M. Delgado, I. Requena	461
Data Analysis: How to Compare Kohonen Neural Networks to Other Techniques	
F. Blayo, P. Demartines	469