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Nota di contenuto	Microcircuits in the brain -- Some reflections on the relationships between neuroscience and computation -- Different types of temporal correlations obtained in pairs of thalamic visual neurons suggest different functional patterns of connectivity -- Development of on-off and off-on receptive fields using a semistochastic model -- The classification of spatial, chromatic, and intensity features of simple visual stimuli by a network of retinal ganglion cells -- Geometric model of orientation tuning dynamics in striate neurons -- Neuronal circuitry in the medial cerebral cortex of lizards -- Interactions between

environmental and hormonal oscillations induce plastic changes in a simple neuroendocrine transducer -- Current Source Density analysis as a tool to constrain the parameter space in hippocampal CA1 neuron models -- Spontaneous activity of hippocampal cells in various physiological states -- Neural network model of striatal complex -- Symmetry and self-organization of the oculomotor neural integrator -- Quantal neural mechanisms underlying movement execution and motor learning -- A model of cerebellar saccadic motor learning using qualitative reasoning -- Balance between intercellular coupling and input resistance as a necessary requirement for oscillatory electrical activity in pancreatic  $\beta$ -cells -- Mechanisms of synchronization in the hippocampus and its role along development -- Analysis of synfire chains above saturation -- Allometry in the Justo Gonzalo's model of the sensorial cortex -- Systems models of retinal cells: A classical example -- A generic formulation of neural nets as a model of parallel and self-programming computation -- Using an artificial neural network for studying the interneuronal layer of a leech neuronal circuit -- Capacity and parasitic fixed points control in a recursive neural network -- The use of prior knowledge in neural network configuration and training -- A model for heterogeneous neurons and its use in configuring neural networks for classification problems -- A computation theory for orientation-selective simple cells based on the MAP estimation principle and Markov random fields -- Competition between feed-forward and lateral information processing in layered neural networks -- Computing functions with spiking neurons in temporal coding -- An introduction to Fuzzy State Automata -- Statistical analysis of regularization constant — From Bayes, MDL and NIC points of view -- Building digital libraries from paper documents, using ART based neuro-fuzzy systems -- Parallelization of connectionist models based on a symbolic formalism -- Generic neural network model and simulation toolkit -- A neural-fuzzy technique for interpolating spatial data via the use of learning curve -- Task decomposition based on class relations: A modular neural network architecture for pattern classification -- Lower bounds of computational power of a synaptic calculus -- Feed Forward Neural Network entities -- Astrocytes and slow learning in the formation of distal cortical associations -- Adaptation and other dynamic effects on neural signal transfer -- Hebbian learning in networks of spiking neurons using temporal coding -- An associative learning model for coupled neural oscillators -- Random perturbations to Hebbian synapses of associative memory using a genetic algorithm -- Phase memory in oscillatory networks -- Strategies for autonomous adaptation and learning in dynamical networks -- Modeling the parallel development of multiple featuremaps and topography in visual cortex -- Stability and hebbian learning in populations of probabilistic neurons -- Stochastic approximation techniques and circuits and systems associated tools for neural network optimization -- Recursive hetero-associative memories for translation -- Universal Binary and Multi-Valued Neurons paradigm: Conception, learning, applications -- Learning a Markov process with a synchronous Boltzmann machine -- The  $\beta$ -EM algorithm: A block connectable generalized learning tool for neural networks -- Training simple recurrent networks through gradient descent algorithms -- On simultaneous weight and architecture learning -- Evolution of structure and learning — A GP approach -- Self-organizing formation of receptive fields and competitive systems -- Optimizing a neural network architecture with an adaptive parameter genetic algorithm -- Self-organizing symbolic learned rules -- Viewing a class of neurodynamics on parameter space

-- Hopfield neural network applied to optimization problems: Some theoretical and simulation results -- A genetic approach to computing Independent And Parallelism in logic programs -- Predicting toxicity of complex mixtures by artificial neural networks -- Regularisation by Convolution in Symmetric-?-Stable function networks -- Continuation of chaotic fields by RBFNN -- Improving the performance of Piecewise linear Separation incremental algorithms for practical hardware implementations -- Accurate decomposition of standard MLP classification responses into symbolic rules -- A hybrid intelligent system for the pre-processing of Fetal Heart rate signals in antenatal testing -- The pattern extraction architecture: A connectionist alternative to the von Neumann architecture -- A two-level heterogeneous hybrid model -- Interpretation of a hierarchical neural network -- Cognitive processes in social interactions — A neural networks' approach -- Adding phase to recurrent backpropagation networks: An application to binding tasks in vision -- Schema-based learning: Biologically inspired principles of dynamic organization -- Digital connectionist hardware: Current problems and future challenges -- EpsilonNN — A specification language for the efficient parallel simulation of neural networks -- Forward-backward building blocks for evolving neural networks with intrinsic learning behaviours -- A cascade network algorithm employing Progressive RPROP -- Tight bounds on the size of neural networks for classification problems -- On the possibilities of the limited precision weights neural networks in classification problems -- A modified backpropagation algorithm to tolerate weight errors -- A high performance SOFM hardware-system -- On application incentive and constraints for neural network hardware development -- A fast Kohonen net implementation for spert-II -- Synthesis and optimization of a bit-serial pipeline kernel processor -- A hardware implementation of CNNs based on Pulse Stream Techniques -- Evaluation of the CNAPS neuro-computer for the simulation of MLPS with receptive fields -- AFAN, a tool for the automatic design of fuzzy and neural controllers -- A fully stochastic fuzzy logic controller -- Multi-Neural Networks hardware and software architecture: Application of the divide to simplify paradigm DTS -- A fuzzy controller for switching regulators with programmable control surfaces -- The Kohonen algorithm: A powerful tool for analysing and representing multidimensional quantitative and qualitative data -- Constrained neural network for estimating sensor reliability in sensors fusion -- Statistical analysis of the main parameters in the definition of Radial Basis Function networks -- Structural level comparison of two basic paradigms in neural computation -- Symmetry: Between indecision and equality of choice -- A non-convergent on-line training algorithm for neural networks -- Using classical and evolutive neural models in industrial applications: A case study for an automatic Coin Classifier -- A new type of unsupervised growing neural network for biological sequence classification that adopts the topology of a phylogenetic tree -- Classification of the onset of respiratory difficulties in ventilation assisted neonates -- A neural network approach for symbolic interpretation in critical care -- ECG beat classification with synaptic delay based artificial neural networks -- Neural network-based insulin infusion control for an insulin-pump, using discontinuous blood glucose measurements -- Intraclinic breast carcinoma: Application of neural networks techniques for the indication of radioguided biopsias -- Detection of Glaucoma by means of ANNs -- A comparative analysis of the neonatal prognosis problem using artificial neural networks, statistical techniques and certainty management techniques -- Models of visual processing derived from

cortical microelectrode recordings -- Rotation invariant IR object recognition using adaptive kernel subspace projections with a neural network -- Neural networks based projectivity invariant recognition of flat patterns -- The instant laboratory: Bringing intelligence to the workflow -- A biological front-end processing for speech recognition -- Non parametric coding of speech by means of a MLP with hints -- Gray-level object segmentation with a network of FitzHugh-Nagumo oscillators -- Multidimensional filtering inspired by retino-cortical projection: Application to texture segmentation -- A competitive neural network for blind separation of sources based on geometric properties -- A new bio-inspired algorithm for early vision edge detection and image segmentation -- Function of biological asymmetrical neural networks -- Identification of spectral features as sound localization cues in the external ear acoustics -- Phoneme recognition by means of predictive neural networks -- Shift-invariant fuzzy-morphology neural network for occluded target recognition -- A comparative study between linear and nonlinear speech prediction -- Recognition model with extension fields -- A GA-optimized neural network for classification of biological particles from electron-microscopy images -- Application of artificial neural networks to the design and implementation of electronic olfactory systems -- Application of a multilayer discrete-time CNN to deformable models -- Spoken-digit recognition using self-organizing maps with perceptual pre-processing -- Noise discrimination .

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#### Sommario/riassunto

This book constitutes the refereed proceedings of the International Work-Conference on Artificial Neural Networks, IWANN'97, held in Lanzarote, Canary Islands, Spain, in June 1997. The volume presents 142 revised full papers selected from an overwhelming wealth of submissions. The volume is divided into sections on biological foundations of neural computation, formal tools and computational models of neurons and neural nets architectures, plasticity phenomena, complex systems dynamics, cognitive science and AI, neural nets simulation, emulation and implementation, methodology for data analysis, task selection and net design, neural networks for perception, and neural networks for communications, control and robotics.

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