



# ICONIP'98

**The Fifth International Conference on Neural Information Processing**

**Jointly with**

**JNNS'98**

**The 1998 Annual Conference of the Japanese Neural Network Society**

**Kitakyushu Japan October 21-23, 1998**

**Editors: Shiro Usui, Takashi Omori**

**Proceedings**

**Volume 1**

**Organized by Japanese  
Neural Network Society**

**JNNS**

**OHM**  
Chrisha

**Sponsored by Asian Pacific  
Neural Network Assembly**

**APNNA**

**IOS**  
Press

# Contents

## Volume I

### Opening Lecture

- Futurre Perspectives and Challenges of Neuroscience .....1  
*Masao Ito (RIKEN)*

### Keynote Lecture 1

- The Theory of Multi-Stage Integration in the Visual Brain .....3  
*Semir Zeki, A. Bartels (University College London)*

### Special Panel 1

- The 21st Century of the Brain .....5  
*S. Amari (RIKEN)*  
*R. Eckmiller (University of Bonn)*  
*A. Guo (Chinese Academy of Science)*  
*R. Hecht-Nielsen (HNC)*  
*N. Kasabov (University of Otago)*  
*S.-Y. Lee (Korea Advanced Institute of Science and Technology)*  
*G. Matsumoto (RIKEN)*  
*H. Szu (The University of Southwestern Louisiana)*  
*L. Xu (The Chinese University Hong Kong)*  
*J. M. Zurada (University of Louisville)*

### Special Organized Session : **Dynamic Brain 1** .....19

- 1a-A-1 Aspects of Signal Representation in the Brain (*Invited*) .....21  
*G. Hauske (Munich University of Technology)*
- 1a-A-2 Single Neurons with Many Weak Presynaptic Terminals: Coding,  
 Uncertainty and Information (*Invited*) .....23  
*J. P. Segundo (UCLA), R. Budelli, R. Saa, L. Gomez (Montevideo),*  
*M. Stiber (University of Washington)*
- 1a-A-3 Firing Dynamics of Electroreceptors (*Invited*) .....27  
*A. Longtin (University of Ottawa)*
- 1a-A-4 Synchrony with Depressive Synapses under Temporally-Fluctuating  
 Stimulus Spikes .....31  
*T. Fukai, S. Kanemura (Tokai University)*

### Organized Session : **From Neuroscience / Neural Computation Research To Profitable Products** .....35

- 1a-B-1 Strategy for the Foundation of a Neurotechnology Company (*Invited*) .....37  
*R. Eckmiller, S. Suchert (Bonn University)*
- 1a-B-2 Trend of a Present Color Management Technology in the Industry (*Invited*) .....40  
*T. Iga, Y. Arai (Toyo Ink), S. Usui (TUT)*
- 1a-B-3 Pathological Diagnosis Support System Using Neural Networks .....44  
*M. Takahashi, Y. Tanaka, K. Tanaka, K. Kyuma, S. Tamai (Mitsubishi)*
- 1a-B-4 Artificial Vision Chip for Industrial Applications (*Invited*) .....48  
*K. Tanaka, K. Kyuma (Mitsubishi)*
- 1a-B-5 Industrial Applications for an Active Vision System Based on Primate  
 Oculomotion and Neural Computation .....50  
*N. Goerke, V. Ortmann, R. Eckmiller (Bonn University)*

<b>Statistical &amp; Mathematical Analysis of Networks</b> .....	53
1a-C-1 A Bootstrap-Based Learning with the Cross Validation .....	55
<i>Y. Mitani, Y. Hamamoto (Yamaguchi University)</i>	
1a-C-2 Inequalities of Generalization Errors for Layered Neural Networks in Bayesian Learning .....	59
<i>S. Watanabe (Tokyo Institute of Technology)</i>	
1a-C-3 Improving the Generalization Performance of the Minimum Classification Error Learning and Its Application to Neural Networks .....	63
<i>J. Rokui, H. Shimodaira (Japan Advanced Institute of Science and Technology)</i>	
1a-C-4 Effect of Batch Learning in Multilayer Neural Networks .....	67
<i>K. Fukumizu (RIKEN)</i>	
1a-C-5 An Experimental Comparison of the Bayesian Ying-Yang Criteria and Cross Validation on Experts Number Selection in Original and Alternative Model for Mixture of Experts .....	71
<i>W.-K. Lam, L. Xu (The Chinese University of Hong Kong)</i>	
1a-C-6 Segmented Representation of Approximation Surface .....	75
<i>K. Uto, Y. Kosugi (Tokyo Institute of Technology)</i>	
<b>Hardware Implementation of Neural Networks</b> .....	79
1a-D-1 HDL Design of Pulse Density Neural Network Using Simultaneous Perturbation .....	81
<i>Y. Maeda, T. Tada, Y. Kanata (Kansai University)</i>	
1a-D-2 Hardware Implementation of PCA Neural Network .....	85
<i>K. Nishizawa, Y. Hirai (University of Tsukuba)</i>	
1a-D-3 Adaptive Blind Equalization Using Bottleneck Networks Implemented by Evolvable Hardware .....	89
<i>M. Murakawa, K. Hiraoka (The Univ. of Tokyo), T. Higuchi (Electrotech Lab.),     T. Furuya (Toho University), S. Yoshizawa (The Univ. of Tokyo)</i>	
1a-D-4 Digital Spikes: Information Representation in ATR's CAM-Brain Machine .....	93
<i>N. E. Nawa (ATR), M. Korkin (Genobyte Inc.), H. de Garis (ATR)</i>	
1a-D-5 A Web Oriented Recurrent Neural Network Simulator .....	97
<i>R. Bone, M. Crucianu, P. Makris, J. P. A. de Beauville     (Ecole d'Ingenieurs en Informatique pour l'Industrie)</i>	
1a-D-6 Analog Neuro-Chips with On-Chip Learning Capability for Active Noise Canceling ( <i>Invited</i> ) .....	101
<i>J.-W. Cho, S.-Y. Lee (Korea Advanced Institute of Science and Technology)</i>	
<b>Robotics &amp; Control</b> .....	105
1a-E-1 Neural Network based Identification of Flexible-Link Manipulator Dynamics .....	107
<i>H. A. Talebi, R. V. Patel (Concordia University), H. Asmer (Canadian Space Agency)</i>	
1a-E-2 Memory-Based Location Estimation and Navigation Using Bayesian Estimation .....	112
<i>M. Ishikawa, S. Kawashima, N. Homma (Kyushu Institute of Technology)</i>	
1a-E-3 Path Planning of Moving Robot by Discrete State Transition of Associative Memory .....	118
<i>K. Mizutani, T. Omori (Tokyo University of Agriculture and Technology)</i>	
1a-E-4 Orientation Estimation Using the Gaussian Mixture Bayes with Regularised EM Algorithm (GMB-REM) for Real Mobile Robot Localisation .....	123
<i>T. Koshizen (Australian National University)</i>	

Organized Session : <b>Brain Imaging in Cognition and Behavior 1</b> .....	127
1a-G-1 Neuromagnetic Studies on Visual Pattern Processings in the Human Brain .....	129
<i>T. Imada (NTT), M. Kawakatsu, M. Kotani (Tokyo Denki Univ.)</i>	
1a-G-2 Fundamental Macro-Properties of Brain Activity Revealed by Magnetoencephalography (MEG) ( <i>Invited</i> ) .....	133
<i>A. Ioannides (RIKEN)</i>	
1a-G-3 Language-Related Neural Activity Measured by Functional Magnetic Resonance Imaging and Magnetoencephalography .....	139
<i>N. Fujimaki (Fujitsu Lab.), S. Miyauchi (Comm.Research Lab.)</i>	
1a-G-4 Functional Human Brain Mapping and Imaging by Transcranial Magnetic Stimulation, Magnetoencephalography, and Direct Current MRI .....	143
<i>S. Ueno (The University of Tokyo)</i>	
<b>Image &amp; Signal Processing</b> .....	147
1a-H-1 A New Method for Automated Image Warping Based on a Variational Approach .....	149
<i>Z. Procházka (Univ. of Electro-Comm.), T. Ito (NHK), T. Okamoto (Univ. of Electro-Comm.)</i>	
1a-H-2 Monochromatic Visualization of Multimodal Images by Projection Pursuit .....	153
<i>Y. Kitaoka, K. Urahama (Kyushu Institute of Design)</i>	
1a-H-3 A Recurrent Neural Filter for Reducing Noise in Medical X-Ray Image Sequences .....	157
<i>K. Suzuki, I. Horiba (Aichi Pref. Univ.), N. Sugie (Meijo Univ.), M. Nanki (Chubu Rosai Hosp.)</i>	
1a-H-4 On the Application of Neural Networks to Non-Linear Image Processing Tasks .....	161
<i>D. de Ridder, R. P. W. Duin, P. W. Verbeek, L. J. van Vliet (Delft University of Technology)</i>	
1a-H-5 Learning Template in Dynamic Link Matching Neural Network .....	166
<i>T. Ishii, K. Kyuma (Mitsubishi)</i>	
1a-H-6 Neuro-Classification of the New and Used Bills Using Time-Series Acoustic Data .....	169
<i>D. Kang, S. Omatu (Osaka Prefecture University)</i>	
Special Organized Session : <b>Dynamic Brain 2</b> .....	173
1e-A-1 Need for Development of Statistical Analysis Tools of Dynamical Neuronal Code — Statistical Evaluation of Joint-PSTH — .....	175
<i>H. Ito (Kyoto Sangyo University)</i>	
1e-A-2 System Dynamics and Olfactory Neural Coding ( <i>Invited</i> ) .....	179
<i>L. M. Kay (California Institute of Technology)</i>	
1e-A-3 Detection of Deterministic Correlations Between Two Pulse Trains .....	183
<i>N. Ichinose, K. Aihara (The University of Tokyo)</i>	
1e-A-4 Models for Fast Analog Computation with Spiking Neurons ( <i>Invited</i> ) .....	187
<i>W. Maass (Technische Universität Graz)</i>	
1e-A-5 Chaotic Behaviors of A Single Neuron Model for Signal Processing Elements .....	189
<i>J. Kuroiwa, S. Nara (Hiroshima University), K. Aihara (The University of Tokyo)</i>	
<b>Distributed Processing Systems 1</b> .....	193
1e-B-1 Soft Fusion of Neural Classifiers .....	195
<i>A. Verikas, K. Malmqvist (Halmstad Univ.),     M. Bacauskiene, A. Lipnickas (Kaunas Univ. of Tech.)</i>	

1e-B-2	Decomposition and Parallel Learning of Imbalanced Classification Problems By Min-Max Modular Neural Network .....	199
	<i>B-L. Lu, M. Ito (RIKEN)</i>	
1e-B-3	Incremental Class Learning Approach and Its Application to Handwritten Digit Recognition .....	203
	<i>J. Mándziuk (Warsaw Univ. of Tech.), L. Shastri (Intern. Comp. Sci. Inst.)</i>	
1e-B-4	Experiments on Three-Dimensional Wire-Frame Object Recognition .....	207
	<i>N. Rishikesh, Y. V. Venkatesh (Indian Institute of Science)</i>	
1e-B-5	Application of ICA in the Separation of Breathing Artifacts in ECG Signals .....	211
	<i>J. O. Wisbeck (Univ. Fed. de Santa Catarina), A. K. Barros (RIKEN), R. G. Ojeda (Univ. Fed. de Santa Catarina)</i>	
1e-B-6	Can Random Generation Measure the Human Brain? .....	215
	<i>M. T. Yamawaki (Miyazaki University)</i>	
<b>Neuro Dynamics &amp; Unsupervised Learning .....</b>		<b>219</b>
1e-C-1	The Composition of Chaos Hopfield Neural Network and Gaussian Machine to the Traveling Salesman Problem .....	221
	<i>N. Ootake, K. Nagasaka (Hosei University)</i>	
1e-C-2	Learning Dynamical Systems by Neural Networks .....	225
	<i>E. Bagarinao, T. Nomura, K. Pakdaman, S. Sato (Osaka University)</i>	
1e-C-3	Effects of Sparsely Spaced Clusters on Lotto-Type Competitive Learning .....	229
	<i>A. Luk, S. Lien (ST. B&amp;P Neural Investments Pty. Ltd.)</i>	
1e-C-4	A Hierarchy from $\alpha$ -EM Algorithm to Vector Quantization and Self- Organization .....	233
	<i>Y. Matsuyama, N. Takeda, S. Furukawa, T. Niimoto (Waseda University)</i>	
1e-C-5	The Correct Convergence of the Rival Penalized Competitive Learning (RPCL) Algorithm .....	239
	<i>J. Ma (Shantou University), L. Xu (The Chin. Univ. of Hong kong)</i>	
1e-C-6	Bayesian Ying-Yang System and Theory as A Unified Statistical Learning Approach (VII): Data Smoothing .....	243
	<i>L. Xu (The Chinese University of Hong Kong)</i>	
<b>Reinforcement Learning 1 .....</b>		<b>249</b>
1e-D-1	Adaptive State Space Formation in Reinforcement Learning .....	251
	<i>K. Samejima, T. Omori (Tokyo University of Agriculture and Technology)</i>	
1e-D-2	Emergence of Expert Modules for Mobile Robot Navigation from a Mixture of Elman Networks .....	256
	<i>K. Horikawa (Tokyo Denki Univ.), H. Asoh (Electrotechnical Lab.), J. Tani (Sony CSL), T. Matsui (Electrotechnical Lab.), M. Kakikura (Tokyo Denki Univ.)</i>	
1e-D-3	A Sequence Learning Architecture Based on Cortico-Basal Ganglionic Loops and Reinforcement Learning .....	260
	<i>R. S. Bapi, K. Doya (Japan Science and Technology Corp.)</i>	
1e-D-4	A Functional Model of Cortico-Basal Ganglia Loop in Motor Control .....	264
	<i>S. Kobayashi, K. Ito (Tokyo Institute of Technology)</i>	
1e-D-5	Automatic Partitioning for Multi-Agent Reinforcement Learning .....	268
	<i>R. Sun (NEC Res. Inst.), T. Peterson (The University Alabama)</i>	
<b>Pattern Recognition .....</b>		<b>273</b>
1e-E-1	Invariant Handwritten Chinese Character Recognition .....	275
	<i>J. N. K. Liu, R. S. T. Lee (Hong Kong Polytechnic University)</i>	

1e-E-2	Modular Structure of Neocognitron to Pattern Recognition .....	279
	<i>J. H. Saito (Univ. Fed. De Sao Carlos), K. Fukushima (Osaka Univ.)</i>	
1e-E-3	Integration of Situated Prior Probability and Neural Network Classifier in a Handwriting Recognition Task .....	283
	<i>Y. Motomura (Electrotechnical Lab.)</i>	
1e-E-4	Recognition of Spatiotemporal Patterns Using a Nonmonotone Neural Network with Hidden Neurons .....	287
	<i>S. Murakami, M. Morita, N. Sakamoto (University of Tsukuba)</i>	
1e-E-5	Korean Character Recognition Using a TDNN .....	291
	<i>K. C. Jung (Kyungpook National Univ.), C. W. Lee (Pochang College), H. J. Kim (Kyungpook National Univ.)</i>	
1e-E-6	Recognition of Hand-Written Patterns by Rotation-Invariant Neocognitron .....	295
	<i>S. Satoh (Tohoku Univ.), J. Kuroiwa (Hiroshima Univ.), H. Aso, S. Miyake (Tohoku Univ.)</i>	
<b>Early Vision 1</b>	.....	<b>301</b>
1e-F-1	Progress of Unsupervised Learning of Early Vision ( <i>Invited</i> ) .....	303
	<i>H. Szu (Univ. of Southwestern Louisiana), C. Hsu (GWU), T. Yamakawa (Kyushu Inst. of Tech.)</i>	
1e-F-2	A Competition between Temporal and Spatial Factors in One-Shot Visual Apparent Motion: Directional Effect .....	307
	<i>T. Sugiura (MITI), K. Sakamoto, T. Kaku, M. Yano (Tohoku University)</i>	
1e-F-3	Figure-Ground Separation from Motion-Subjective Contour and Front Dynamics .....	311
	<i>E. Ueyama (RIKEN), H. Yuasa, S. Hosoe (Nagoya Univ.), M. Ito (RIKEN)</i>	
1e-F-4	Neural Network Model Completing Occluded Contour .....	315
	<i>M. Kikuchi, K. Anada, K. Fukushima (Osaka University)</i>	
1e-F-5	A Neural Network Model of Dynamical Grouping Process .....	319
	<i>T. Yamamura (Nagoya Univ.), S. Kobayashi, I. Horiba, N. Sugie (Meijo University), H. Kudo, N. Ohnishi (Nagoya Univ.)</i>	
Organized Session :	<b>Brain Imaging in Cognition and Behavior 2</b> .....	<b>323</b>
1e-G-1	Changes in Cerebral Activity During Visuomotor Learning with Optical Rotation: A Positron Emission Tomography Study .....	325
	<i>R. Kawashima, K. Inoue, H. Fukuda (Tohoku University)</i>	
1e-G-2	Real-Time Optical Imaging Provides "Dynamic Map of Brain Activity" .....	329
	<i>T. Iijima, I. Takashima, M. Inase, R. Kajiwara, M. Shinoda, T. Takahashi, K. Tsukada, H. Hirose, K. Niisato (Electrotechnical Lab.)</i>	
1e-G-3	Functional Structures from Different Components of Intrinsic Signal in Cat Visual Cortex .....	333
	<i>M. Fukuda, M. Nishizaki, M. Tanifuji (RIKEN)</i>	
1e-G-4	Dynamic Optical Topography and the Real-Time PDP Chip: An Analytical and Synthetical Approach to Higher-Order Brain Functions .....	337
	<i>H. Koizumi, T. Ochiai (Hitachi), T. Okahashi (Hitachi ULSI Systems), Y. Yamashita, A. Maki, T. Yamamoto, Y. Inagami (Hitachi), H. Yoshizawa, M. Iwata (Tokyo Women's Med. College), T. Omori (Tokyo Univ. of A&amp;T), M. Yasunaga (Tsukuba Univ.)</i>	
<b>Image Processing</b>	.....	<b>341</b>
1e-H-1	Noise Removal Based on Classification of Wavelet Coefficients Using Counterpropagation Neural Networks .....	343
	<i>L. Xuequn, I. King (The Chinese University of Hong Kong)</i>	

1e-H-2	Automated Text Categorization Using Support Vector Machine .....	347
	<i>J. T.-Y. Kwok (Hong Kong Baptist University)</i>	
1e-H-3	Image Segmentation Using Genetic Method to Select Feature Indices .....	352
	<i>K. Matsui (Shizuoka University), Y. Kosugi (Tokyo Inst. of Tech.)</i>	
1e-H-4	A Soil Moisture Map Generated from Satellite Data by Using Domains of Attraction in Neural Networks .....	356
	<i>A. Ohkubo, M. Mohamed, K. Nijima (Kyushu University)</i>	
1e-H-5	A Neural System for the Patterns Recognition of Remote Sensing Images .....	360
	<i>M. L. Goncalves (PUC MINAS)</i>	
1e-H-6	Face Image Segmentation by Detecting Attentive Regions of Artificial Neural Network .....	364
	<i>S. Itoh, S. Ishiguro, K. Yamauchi, N. Ishii (Nagoya Institute of Technology)</i>	
<b>Poster Session 1</b> .....		369
<b>Vision</b>		
1P- 1	Generalized Field Effect Method .....	371
	<i>T. Mori, S. Kurosawa, M. Matsumaru, M. Matsuura (Tamagawa University)</i>	
1P- 2	A Study on the Influence of Intermediate Surface Structure in Depth Perception with Binocular Viewing .....	375
	<i>N. Hiromitsu, M. Idesawa (The University of Electro-Communications)</i>	
1P- 3	Binding with and without Attention: a Neural Network Model for Computation of Spatial Relations in Object Perception .....	379
	<i>J. Saiki (Nagoya University)</i>	
1P- 4	A Representation of Form Included Illusory Contours .....	383
	<i>A. Suzuki, M. Yano (Tohoku University)</i>	
1P- 5	Fast Calculation Method for Stereoscopic Vision with Pattern Recognition Equation and Image Processing .....	387
	<i>Y. Yoshitomi, T. Shii, T. Kitazoe (Miyazaki University)</i>	
1P- 6	Sequential Stereoscopic Vision and Hysteresis .....	391
	<i>T. Kitazoe, J. Tomiyama, Y. Yoshitomi, T. Shii (Miyazaki University)</i>	
1P- 7	A Dynamical Model of Stereopsis to Form 3-D Surfaces .....	397
	<i>N. Sato, M. Yano (Tohoku University)</i>	
1P- 8	Correspondence Procedure for Recovery of Rigid Structure from Orthographically Projected Optical Flow — A computational Aspect of Kinetic Depth Effect — .....	401
	<i>H. Kudo (Nagoya Univ.), M. Umeda, I. Horiba, N. Sugie (Meijo University), T. Yamamura, N. Ohnishi (Nagoya Univ.)</i>	
1P- 9	Reconstruction of Visual Sensory Space on the Hidden Layer in Layered Neural Networks .....	405
	<i>K. Shibata, K. Ito (Tokyo Institute of Technology)</i>	
1P-10	Pursuit Movement of Pan-Tilt Camera by Feedback-Error-Learning .....	409
	<i>S. Akaho (Electrotechnical Lab.), Y. Goto (Saitama Univ.), T. Kurita (Electrotechnical Lab.), H. Mizoguchi (Saitama Univ.)</i>	
1P-11	Self-Organizing Model for the Detection of Really Moving Objects .....	413
	<i>K. Miura (JST), T. Nagano (Hosei Univ.), K. Kawano (JST)</i>	
1P-12	Face Shape and Position Recognition in Two-D Space by Spreading Associative Neural Network .....	417
	<i>K. Nakamura, N. Kinoshita, T. Yoshikawa (Toyama Prefectural University)</i>	

**Cognitive Systems**

- 1P-13 Learning and Recollection of Human Faces by Association Cortex to Entorhinal-Hippocampal Neural Network Model .....421  
*K. Nakamura, K. Ohzawa, J. Liu, M. Yoshida (Toyama Prefectural University)*
- 1P-14 Simulation Studies on the Effects of Education in Alzheimer's Disease .....425  
*K. Kato, K. Kishi (Jichi Medical School)*
- 1P-15 For Grasping Brain Architecture .....428  
*H. Itoh, K. Aihara (The University of Tokyo)*
- 1P-16 A Model of the Hippocampus - Neocortex for Episodic Memory .....431  
*M. Ito (Tohoku Univ.), J. Kuroiwa (Hiroshima Univ.), S. Miyake (Tohoku Univ.)*

**EEG**

- 1P-17 A New Measurement of Complexity for Studying EEG Mutual Information .....435  
*F. Chen (Fudan Univ.), J. Xu (Academia Sinica), F. Gu (Fudan Univ.),  
 Z. Liu, R Liu (Shanghai Univ.)*
- 1P-18 An Estimation of the Bispectrum for the EEG in Emotional States .....438  
*E.-S. Kim, D.-Y. Cho, Y.-J. Lee (Sunmoon University), C.-S. Ryu (Elec. & Telecom. Res. Inst.)*
- 1P-19 Can an Alpha-Induced Stimulator Enhance a Memory Process in the Brain? .....442  
*S. Han, S. Jin, Y. Jeong, J. Jeong (KAIST), D.-J. Kim (The Catholic Univ. of Korea),  
 C.-H. Kim, C.-K. Kim, S.-Y. Kim (KAIST)*
- 1P-20 A General Relation among Power Spectral Values of the Human Spontaneous EEG .....446  
*J. M. Choi, B. H. Bae, S. Y. Kim (Korea Advanced Institute of Science and Technology)*
- 1P-21 Principal Pattern Analysis of Sleep Deprived Human EEG .....449  
*H. Kim (KAIST), D.-J. Kim (The Catholic Univ. of Korea),  
 S.-Y. Kim (KAIST), H. J. Go (The Catholic Univ. of Korea)*
- 1P-22 Tests for Deterministic Dynamics in EEG .....455  
*J. Jeong, M. S. Kim, S.-Y. Kim (Korea Advanced Institute of Science and Technology)*

**Others**

- 1P-23 Investigation of Nonlinear Structure of Brain Dynamics Assuming a Text as a Time Series .....459  
*T. Macharashvili (National Health Management Center)*
- 1P-24 Proposal of a Brain-Type System Architecture Based on Self-Organizing Consciousness Using Coherence .....463  
*A. Hirose (The University of Tokyo)*
- 1P-25 Object Recognition and Formation of Hand Shape in Human Grasping Movements .....467  
*H. Fukuda, N. Fukumura, M. Katayama, Y. Uno (Toyohashi University of Technology)*
- 1P-26 Symbolized Particles Store Type Neuron Model and Its Application to Voiced Signals .....471  
*K. Miyamoto, Y. Tsubusaki, T. Yanaru, M. Nagamatu (Kyushu Institute of Technology)*
- 1P-27 An Emotion Processing System Based on Subjective Observation .....474  
*N. Shirahama (Kitakyushu National College of Tech.),  
 M. Nagamatsu, Y. Torao (Kyushu Inst. of Tech.)*
- 1P-28 Blind Signal Separation with a Flexible Non-Linearity .....478  
*H. Liang, N. Logothetis (Max-Planck Institute for Biological Cybernetics)*
- 1P-29 Reversed Pattern Generation Phenomenon Observed in a Sensorimotor Coordinated System .....482  
*H. Wakuya, K. Shida (Saga University)*



**Statistical & Mathematical Analysis of Networks**

1P-30	Averaging Ensemble Neural Networks in Parameter Space	486
	<i>P. Guo (The Chinese University of Hong Kong)</i>	
1P-31	Probabilistic and Statistical Aspects of Feed-Forward Nonlinear Neural Networks	490
	<i>T. Koshimizu, M. Tsujitani (Osaka Electro-Communication University)</i>	
1P-32	Energy Functions for Efficient Nonlinear Dimensionality Reduction by Multi Layer Perceptrons	494
	<i>T. Takahashi, R. Tokunaga (University of Tsukuba)</i>	
1P-33	Maximum Likelihood Weights for a Linear Ensemble of Regression Neural Networks	498
	<i>M. C. van Wezel, W. A. Kusters, J. N. Kok (Leiden University)</i>	
1P-34	Upper Bounds on the Expected Training Errors of Neural Networks Regressions for a Gaussian Noise	502
	<i>K. Hagiwara, K. Kuno (Mie Univ.), S. Usui (Toyohashi Univ. of Tech.)</i>	
1P-35	An Improvement of AdaBoost to Avoid Overfitting	506
	<i>G. Räetsch (GMD FIRST), T. Onoda (CRIEPI), K. R. Müller (GMD FIRST)</i>	
1P-36	Analysis on the Nonlinear Transform of Weighted Sum Errors in Feedforward Neural Networks	510
	<i>D.-G. Jeong (Woosuk University), S.-Y. Lee, S.-Y. Kim (KAIST)</i>	
1P-37	Proposing Matchability Criterion for Situation Decomposition — Extracting situations each of which contains a rule —	514
	<i>H. Yamakawa (Real World Computing Partnership)</i>	

**Neuro Dynamics & Unsupervised Learning**

1P-38	The Stability of the Solution in Fully Connected Neural Networks with the Encouragement Factor	518
	<i>T. Nitta (Electrotechnical Lab.)</i>	
1P-39	A Proof of Convergence of Asynchronous Boltzmann Machine	522
	<i>H. Zhu, M. Sasaki, T. Inoue, K. Sigitani (Kumamoto University)</i>	
1P-40	A Periodic Chaos Neural Network	526
	<i>M. Nakagawa (Nagaoka University of Technology)</i>	
1P-41	Mean Field Approximation in Bayesian Variable Selection	530
	<i>Y. Iba (The Institute of Statistical Mathematics)</i>	
1P-42	Examination of Mean Field Approximation Based on Linear Response Theorem for Boltzmann Machine Learning	534
	<i>T. Kuroki, T. Tanaka, M. Taki (Tokyo Metropolitan University)</i>	
1P-43	A New Dynamical Memory System Based on Chaotic Neural Networks	538
	<i>K. Kojima, K. Ito (Tokyo Institute of Technology)</i>	
1P-44	The Improvements of the Learning Vector Quantization Method	542
	<i>T. Yokoo, K. Nagasaka (Hosei University)</i>	
1P-45	A New Vector Quantization Algorithm with Annealing Operation for Time-Varying Data	546
	<i>S. Yoshizawa, S. Doki, S. Okuma (Nagoya University)</i>	
1P-46	Modified Counter-Propagation Network	550
	<i>K. Fujimura, H. Tokutaka (Tottori University), M. Ishikawa (Kyushu Inst. of Tech.)</i>	
1P-47	Estimation of Third-Order Correlations within Mean Field Approximation	554
	<i>T. Tanaka (Tokyo Metropolitan University)</i>	

**Hardware Implementation of Neural Networks**

1P-48	A Fuzzy Recognition Integrated Circuit .....	558
	<i>W. Lu, B. Shi, Z. Li (Tsinghua University)</i>	
1P-49	A Current Mode VLSI Neural Fuzzy Classifier for Unconstrained Handwritten Numeral Classification .....	562
	<i>G. Li, B. Shi (Tsinghua University)</i>	
1P-50	A Unified Design Method which Generates a Fault Tolerant MLP while Minimizing the Quantization Effects .....	566
	<i>O.-J. Kwon (Electronics and Telecomm. Res. Inst.), S.-Y. Bang (Pohang Univ.of Sci. &amp; Tech)</i>	
1P-51	Temporal Pattern Discrimination Using the Brain Mimic Processor .....	570
	<i>S. Takahashi, H. Hakoda, Y. Sekine (Nihon University)</i>	
1P-52	Summation Characteristics of PDM Digital Neural Network System .....	574
	<i>H. Toda, Y. Hirai (University of Tsukuba)</i>	
1P-53	An One-Dimensional analog Vision Chip System with Light-Adaptive Gain Control .....	578
	<i>S. Kameda, A. Honda, T. Yagi (Kyushu Institute of Technology)</i>	
1P-54	Nonlinear Function Generators and Chaotic Signal Generators Based on Pulse-Phase Modulation .....	582
	<i>S. Sakabayashi, T. Morie, M. Nagata, A. Iwata (Hiroshima University)</i>	
1P-55	Oscillator Networks for Image Segmentation and Their Circuits Using Pulse Modulation Methods .....	586
	<i>H. Ando, T. Morie, M. Nagata, A. Iwata (Hiroshima University)</i>	