ICONIP’02

Proceedings of the
9th International Conference on Neural Information Processing

Computational Intelligence for the E-Age

Volume 3

Lipo Wang, Jagath C. Rajapakse, Kunihiko Fukushima, Soo-Young Lee, and Xin Yao (Editors)

November 18 - 22, 2002

Orchid Country Club, Singapore
Contents

Volume 3

WedAmRm7: Special Session on Complex-Valued Neural Networks
Chair(s): Tohru Nitta (National Institute of Advanced Industrial Science and Technology, Japan)

Recent Progress in Coherent Lightwave Neural Systems (#2159) .............................................1074
Akira Hirose and Sotaro Kawata

On Energy Function for Complex-Valued Neural Networks and Its Applications (#2173) .............1079
Yasuaki Kuroe, Naoki Hashimoto and Takehiro Mori

A Complex-Valued Neuron to Transform Gray Level Images to Phase Information (#2174) ..........1082
Hiroyuki Aoki

Covariance Phasor Neural Network as a Mean Field Model (#1367) .............................................1089
Haruhisa Takahashi

Surface Classification Using Ann and Complex-Valued Neural Network (#2177) .........................1094
A Prashanth, Prem Kalra and Nalinaksh Vyas

On the Critical Points of the Complex-Valued Neural Network (#2131) .......................................1099
Tohru Nitta

WedPmRm1Ss1: Special Session on Neural Networks for Control Applications I
Chair(s): Jun Wang (Chinese University of Hong Kong, Hong Kong)

Multilayer Recurrent Neural Networks for Real-Time Robust Pole Assignment (#2185) .................1104
Sanqing Hu and Jun Wang

Parameter Estimation of ARX/NARX Model: A Neural Network Based Method (#2162) .................1109
Dan Wang, Kai Yew Lum and Guanghong Yang

Exponential Stability of the Steady State Solution of Hopfield Neural Networks with Reaction-Diffusion Terms Under the L_{2} Norm (#2220) .................................................................1114
Xinquan Zhao, Lun Zhou and Xiaoxin Liao

WedPmRm2Ss1: Neuroscience II
Chair(s): Chantal Bard (Laval University, Canada); Jose Torreao (Univeridade Federal Fluminense, Brazil)

Predicting the Timing of Motor Commands in a Synchronization Task: A PET Study (#1836) ..........1120
Chantal Bard, Jean Sébastien Blouin, Jacques Paillard and Julien Doyon

An Analytical Model for the Disparity Selectivity Profiles of Binocular Neurons (#1844) ................1125
Jose Torreao

A Role of Burst Firings of Hindbrain Neurons in Detecting Object Distance in Electrolocation (#1353) ......1130
Eiji Murase, Yoshiki Kashimori, Meihong Zheng and Takeshi Kambara

A Model of Implicit Association Learning Based on Plasticity in the Perirhinal Cortex (#1545) ..........1135
Shigemitsu Morokami, Atsuo Suemitsu and Masahiko Morita
WedPmRm3Ssl: Special Session on Trends in Global Optimization
Chair(s): Andries Engelbrecht (University of Pretoria, South Africa)

Surrogate-Assisted Coevolutionary Search (#2126) .......................................................... 1140
Yew Soon Ong, Andy Keane and Prasanth Nair

Characteristic Updating-Normalisation Dynamics of a Self-Organising Neural Network for Enhanced Combinatorial Optimisation (#2149) .......................................................... 1146
Terence Kwok and Kate Smith

Coordinated Scheduling of Production and Delivery from Multiple Plants and with Time Windows Using Genetic Algorithms (#2158) .......................................................... 1153
Jose M. Garcia, Sebastian Lecano, Kate Smith, Terence Kwok and Gabriel Villa

GP-Based Optimisation of Technical Trading Indicators and Profitability in FX Market (#2187) .......... 1159
Cheng Lee and Khai Loh

WedPmRm4Ssl: Special Session on Multi-Stability, Perceptual Ambiguity, and the Brain
Chair(s): Cees van Leeuwen (RIKEN Brain Science Institute, Japan)

Ambiguous Figures, Fixation Durations, and the Bus-Paradox (#2204) ...................................... 1164
Cees Van Leeuwen, Maartje Aukes and Marjolein Luman

Different Interpretations of Ambiguously Occluded Figures are Reflected in Eye Movements (#2115) ...... 1169
Gijs Plomp, Chie Nakataot and Cees Van Leeuwen

Eye Movements During Perceptual Switches in the Pointing Triangles Illusion (#2145) .................. 1174
Andrey Nikolaev, Junji Ito, Maartje Aukes, Marjolein Luman, Chie Nakataot and Cees van Leeuwen

The “Meaning” of Structure in Digits (#1047) .......................................................... 1177
Eshaa Alkhalifa

WedPmRm5Ssl: Perception, Emotion, and Cognition II
Chair(s): Andreas Ioannides (RIKEN Brain Science Institute, Japan)

Tomographic and Spatiotemporal Correlates of Short-Term Plasticity in Human Primary Somatosensory Cortex from Magnetoencephagramphic (MEG) Data (#1864) .......................................................... 1183
Li Chan Liu, Nikolaos Laskaris, Vahe Poghosyan, Peter Fenwick and Andreas Ioannides

On-Line Speech-Reading System for Japanese Language (#1809) ............................................ 1188
Tarek El. Tobely, Naoyuki Tsuruta and Makoto Amamiya

Glenmore: An Interactive Activation Model of Eye Movement Control in Reading (#1513) ............ 1194
Ronan G. Reilly and Ralph Radach

The Use of Lexical Basis Functions to Characterize Faces, and to Measure Their Perceived Similarity (#2070) ......................................................................................................................... 1201
John A. Black, Jr., Kanav Kahol, Prem Kuchi and Sethuraman Panchanathan

WedPmRm6Ssl: Applications of Genetic Algorithms
Chair(s): Setsuko Sakai (Hiroshima Shudo University, Japan); Rui Jiang (Hong Kong University of Science and Technology, Hong Kong)

Discovering Investment Strategies in Portfolio Management: A Genetic Algorithm Approach (#1180) .... 1206
Rui Jiang and Kowk Yip Szeto
Structural Optimization of Neural Network by Genetic Algorithm with Damaged Genes (#1267) .................................................. 1211
Tetsuyuki Takahama and Setsuko Sakai

Field Measurement of Multi-sound Directions by Using Microphone Array System Based on Genetic Algorithm (#1425) ........................................................................................................................................................................... 1216
Takeshi Hamahara, Kazuharu Kuroiwa and Osamu Hoshino

Genetic Algorithms for Optimal Channel Assignment in Mobile Communications (#2186) .................................................. 1221
Lipo Wang, S. Arunkumaar and Wen Gu

WedPmRm7Ss1: Cognitive Science
Chair(s): Mehdi N. Shirazi (Osaka Institute of Technology, Japan); Ko Sakai (University of Tsukuba, Japan)

Thalamic Dis-Inhibition Strengthens the Retinal Inhibitory Surrounds at the Lateral Geniculate Nucleus (#1354) ........................................................................................................................................................................... 1226
Mehdi N. Shirazi

Integration of Space and Time Leading to the Simultaneous Perception of Depth and Motion —Perception of Objects Moving Behind a Thin Slit —(#1424) ........................................................................................................................................................................... 1231
Mitsuharu Ogiya, Ko Sakai and Yuzo Hirai

A Model of Word Meaning Inference Development in Child (#1585) ........................................................................................................................................................................... 1236
Takayuki Shimotomai and Takashi Omori

A Dynamic Neural Network Model on Global-to-Local Interaction over Time Course (#1715) .................................................. 1241
KangWoo Lee, Jianfeng Feng and Hilary Buxton

WedPmRm1Ss2: Special Session on Neural Networks for Control Applications II
Chair(s): Jun Wang (Chinese University of Hong Kong, Hong Kong)

A Neural Network Model for Discrete-Time Optimal Control with Control Constraints (#2210) .................................................. 1248
Li-Zhi Liao and Ka Kit Cheung

Neural Network-Based Adaptive Critic Designs for Self-Learning Control (#2122) .................................................. 1252
Derong Liu

A Fuzzy Neural Network Approximator with Fast Terminal Sliding Mode and Its Applications (#2127) .................................................. 1257
Shuanghe Yu, Xinghuo Yu and Zhihong Man

Smart Neural Control of Pure-Feedback Systems (#2135) ........................................................................................................................................................................... 1262
Cong Wang, Guanrong Chen, Shuzhi S. Ge and David J. Hill

A Method for Applying Multilayer Perceptrons to Control of Nonlinear Systems (#2139) .................................................. 1267
Jinglu Hu and Kotaro Hirasawa

Treatment Optimization with a Neural Control System (#2039) .................................................. 1272
Paul Munro and Siripun Sanguansintukul

WedPmRm2Ss2: Self-Organizing Feature Maps and Vector Quantization II
Chair(s): Chi Sing Leung (Hong Kong Baptist University, Hong Kong)

Soft-Decoding for Self-Organized Map (#2047) .................................................. 1277
Chi Sing Leung and Sen Jiang

A Code-Reduction Technique for An Image Enlargement by Using a SOM-Based Fuzzy Interpolation (#1257) .................................................. 1281
Takashi Aso, Noriaki Suetake and Takeshi Yamakawa
A Simple Learning Algorithm for Growing Ring SOM and Its Application to TSP (#1508) ........................................ 1287
Hiroki Sasamura, Ryuji Ohta and Toshimichi Saito

A Comparison of 1-D and 2-D Self-Organizing Feature Map Algorithm on Color Image Quantization (#1571)
.............................................................................................................. 1291
Songul Albayrak

A SOM-Based Method for Feature Selection (#1687) .................................................. 1295
Huilin Ye and Hanchang Liu

Gesture Recognition Based on SOM Using Multiple Sensors (#1201) ........................................ 1300
Masumi Ishikawa and Naohiro Sasaki

WedPmRm3Ss2: Hardware Implementation of Neural Networks
Chair(s): Amos Omondi (Flinders University, Australia); Jang-Kyoo Chin (Kyungpook National University, South Korea)

Biologically Motivated Active Vision System Using Artificial Retina Chip and Shape Memory Alloy Actuator (#1356) ......... 1305
Won-Cheol Kim, Jung-Hwan Kim, Minho Lee, Jang-Kyoo Shin and Hiroo Yonezu

Shunting Inhibition-Based On-Chip Processing for CMOS Imagers (#1190) ............................. 1310
Farid Boussaid, Amine Bermak and Abdesselam Bouzerdoum

Analog Network for Detection of Approaching Object with Shape Recognition Based on Visual Systems of Lower Animals (#1428) .................................................. 1315
Kimihiro Nishio, Hiroo Yonezu, Masahiro Ohtani, Hitoshi Yamada and Yuzo Furukawa

A Novel Digital Neural Network for the Travelling Salesman Problem (#1805) ............................ 1320
Ankush Verma and Jayadeva

Hardware Neuron Models with CMOS for Auditory Neural Networks (#1950) ........................... 1325
Katsutoshi Saeki, Ryusuke Iidaka, Yoshifumi Sekine and Kazuyuki Aihara

Advanced Self-Organizing Maps Using Binary Weight Vector and Its Digital Hardware Design (#2258) .................. 1330
Takeshi Yamakawa, Keiichi Horio and Tomokazu Hiratsuka

WedPmRm4Ss2: Statistical Neural Network Models II
Chair(s): Sumio Watanabe (Tokyo Institute of Technology, Japan)

Singularities in Neural Networks Make Bayes Generalization Errors Smaller Even if They Do Not Contain the True (#1744) ................................................................. 1336
Sumio Watanabe and Shun-Ichi Amari

On-Line Learning with Recycled Examples: A Cavity Analysis (#1294) ........................................ 1341
Peixun Luo and K.Y. Michael Wong

Topological Local Principal Component Analysis (#1101) .................................................. 1346
Zhi-Yong Liu and Lei Xu

Neural Cryptography (#1753) ........................................................................ 1351
Wolfgang Kinzel and Ido Kanter

Resolution of Singularities in Mixture Models and Its Stochastic Complexity (#1779) ...................... 1355
Keisuke Yamazaki and Sumio Watanabe

Quantum Gauged Neural Network: U(1) Gauge Theory (#1863) ........................................... 1360
Yukari Fujita and Tetsuo Matsui

WedPmRm5Ss2: Independent Component Analysis

xxix
Chair(s): Erkki Oja (Helsinki University of Technology, Finland)

Convergence of the Symmetrical Fastica Algorithm (#1410) .............................................. 1368
Erkki Oja

Supervised-Unsupervised Combined Neural Learning for Independent Component Analysis (#1449) .... 1373
Yang Chen and Zhenya He

New ICA Based Thermal Error Compensation System (#1519) ..................................................... 1378
Dong Soo Lee, Jin Young Choi and Doo-Hyun Choi

Blind Source Separation of Acoustic Mixtures Using Time-Frequency Domain Independent Component
Analysis (#1691) ......................................................................................................................... 1383
S.Jayaraman Athreya, Sitaraman Ganapathy Subramanian and Seshadri Rengarajan

Subspace Blind Extraction by Less-Complete ICA (#1947) ............................................................. 1388
Wei Lu and Jagath Rajapakse

Picture Blind Source Separation by Auto-Encoder Identity Mapping with Structural Pruning (#2073) ...... 1393
Syozo Yasui, Shuntaro Takahashi and Tetsuo Furukawa

WedPmRm6Ss2: Support Vector Machines and Kernel Methods II
Chair(s): Irwin King (Chinese University of Hong Kong, Hong Kong); Sung-Bae Cho
(Yonsei University, South Korea)

Non-Fixed and Asymmetrical Margin Approach to Stock Market Prediction Using Support Vector Regression
(#1913) ........................................................................................................................................ 1398
Yang Haiqin, King Irwin and Chan Laiwan

Incremental Support Vector Machine for Unlabeled Data Classification (#1808) ..................................... 1403
Jin Hyuk Hong and Sung-Bae Cho

Additional Learning and Forgetting by Support Vector Machine and RBF Networks (#1337) .................. 1408
Hirotaka Nakayama and Atsushi Hattori

Optimization for Black-Box Objective Functions Using Sensitivity Information in SVM (#1336) ............. 1413
Hirotaka Nakayama and Koji Washino

Decision-Tree-Based Multiclass Support Vector Machines (#1048) .................................................... 1418
Fumitake Takahashi and Shigeo Abe

Locating Support Vectors Via $\beta$-Skeleton Technique (#1968) ....................................................... 1423
Wan Zhang and Irwin King

WedPmRm7Ss2: Reinforcement Learning I
Chair(s): Frederic Maire (Queensland University of Technology, Australia)

Anticipative Reinforcement Learning (#1106) ..................................................................................... 1428
Frederic Maire

Teacher-Forced Information Theoretic Competitive Learning (#1247) .................................................. 1433
Ryotaro Kamimura and Fumihiko Yoshida

Pattern Classification Using Fuzzy Adaptive Learning Control Network and Reinforcement Learning (#1371)
.......................................................................................................................................................... 1439
Kian Hong Quah, Hiok Chai Quek and Graham Leedham

Effect of Force Load in Hand Reaching Movement Acquired by Reinforcement Learning (#1877) .......... 1444
Katsunari Shibata and Koji Ito

Reinforcement Learning Based on a Statistical Value Function and Its Application to a Board Game (#1928)
**WedPmRm12Ss1: Special Session on Artificial Immune Systems and Their Applications**

Chair(s): Xufa Wang (University of Science and Technology of China, China)

Towards Immune Inspired Fault Tolerance in Embedded Systems (#2130) ........................................ 1459
Jonathan Timmis, Rogerio de Lemos, Modupe Ayara and Ross Duncan

Immune, Swarm, and Evolutionary Algorithms Part I: Basic Models (#2140) ........................................ 1464
Leandro Nunes de Castro

Immune, Swarm, and Evolutionary Algorithms Part II: Philosophical Comparisons (#2141) .............. 1469
Leandro Nunes de Castro

Intrusion Detection Oriented Distributed Negative Selection Algorithm (#2152) ............................... 1474
Wenjian Luo, Xianbin Cao, Jiying Wang and Xufa Wang

Adenoids: A Hybrid Ids Based on the Immune System (#2183) .................................................... 1479
Fabricio Paula, Marcelo Reis, Diego Fernandes and Paulo De Gens

Multiuser Detection Based on the Immune Strategy RBF Network (#2194) ...................................... 1485
Lei Wang and Michele Courant

**WedPmRm13Ss2: Neuroscience III**

Chair(s): Jagath Rajapakse (Nanyang Technological University, Singapore)

mGluRs Effect Needs to Reproduce Spike Timing Dependent Plasticity from Postsynaptic Calcium
Concentration (#1351) .............................................................. 1490
Hidetoshi Urakubo and Masataka Watanabe

Long-Term Evaluation of Synchronization Between Scalp EEG Signals in Partial Epilepsy (#1759) .... 1495
Elly Gysels, Michel Le Van Quyen, Jacques Martinierie, Paul Boon, Kristl Vonck, Ignace Lemahieu and Rik Van De Walle

Fuzzy Region Integration Approach for Subcortical Structure Segmentation (#2241) ....................... 1499
Shichun Peng and Jagath Rajapakse

Adaptation to Visual Distortion in Motor Coordination in Childhood (#1837) ................................. 1504
Chantal Bard, Michelle Fleury and Carole Ferrel-Chapus

Discussions of Neural Network Solvers for Inverse Optimization Problems (#1909) ......................... 1509
Tomoo Aoyama and Umpei Nagashima

Artificial Intelligence Behavior in Dynamic Knowledge Base (#1034) ........................................... 1513
Shigeki Sugiyama

Effects of Dopamine on Interaction of the Two Corticostriatal Systems in RAT Somatnsery Striatum. (#1215) ................................................................. 1518
Sankari Ramanathan, Ann. K Wright and Gordon. W Arbutnott

Cerebral and Hippocampal Volumetry in Early Alzheimer's Disease (#1939) ................................. 1523
Yih-Yian Sitoh, Jagannathan Karrhik, Jagath C Rajapakse, Wee-Tin Hong, Wei-Ling Lee, Suresh Sahadevan and Jing-Jih Chin

**WedPmRm14Ss2: Neurobiology and Neurophysiology**
Chair(s): Taketeru Kuramoto (University of Tsukuba, Japan)

Temporal Dynamics Revealed by Paired Stimulation in the Sensory Cortex (#1867) .................................1527
Sang-Eok Kim and Hyung-Cheul Shin

Spatiotemporal Electrical Activity Patterns in Snail Brain Neuronal Networks (#1100) .......................1531
Tsuyoshi Shimada, Yoshihiro Kiri-i, Takehiko Ogawa and Akio Kawana

Soft Computing Approach to Brain Structure Segmentation (#1694) .......................................................1534
Jagath Rajapakse, Li Shan, Shi Jian and Shichun Peng

Enhanced Discrimination in Autism (#1218) .........................................................................................1539
Michelle O’riordan and Filippo Passetti

A Switching Mechanism in a Neuronal Rhythm Synthesizer, the Neurogenic Pacemaker of Lobster Heart.
(#1706) .................................................................................................................................1543
Taketeru Kuramoto

Cortical Software Re-Use: A Computational Principle for Cognitive Development in Robots (#1505) ........1548
Ronan Reilly and Ioana. D Marian

Neural Networks for Genome Signature Analysis (#1598) ...............................................................1554
Liangyou Chen and Lois Boggess

WedPmRm15Ss2: Learning and Memory III
Chair(s): Tatsuo Kitajima (Yamagata University, Japan)

Decoding Whispered Vocalizations: Relationships Between Social and Emotional Variables (#1904) ..........1555
Jasmin Cirillo and Dietmar Todt

Change in Saccadic Reaction Time Due to the Presentation of the Cue of Target Information (#1376) ..........1564
Yoshiaki Tsunoda and Kiyohiko Nakamura

Modeling of Synaptic Plasticity Via Correlated Pre- and Postsynaptic Activity (#1922) .........................1569
Tatsuo Kitajima, Makoto Nishiyama and Ken-Ichi Hara

How Birds Memorise and Retrieve Information Encoded on Different Hierarchy Levels of Singing (#1903) \n.....................................................................................................................................................1574
Jasmin Cirillo and Dietmar Todt

From Habits to Actions: Dorsolateral Striatum Lesions Alter the Content of Learning (#1725) ..................1579
Henry Yin, Barbara Knowlton and Bernard Balleine

Calcium Beat: Internal Calcium Stores Regulating the Rhythm of Spontaneous Neurotransmitter Release
(#2250) ..............................................................................................................................................1582
Richardson N. Leao, Sharon Oleskevich and Bruce Walmsley

WedPmRm16Ss2: Neurodynamics and Spiking Neurons III
Chair(s): S. H. Srinivasan (Satyam Computer Services Ltd, India)

Information Transfer in Neurons with Depressing Synapses (#2002) ....................................................1587
S H Srinivasan and Anusha Narayan

Neuronal Dynamics Based on Individual Stochastic ION Channels (#1387) .........................................1592
Go Ashida and Masayoshi Kubo

Oscillatory Phenomena in Hippocampal CA3 Model with Excitatory and Inhibitory Neurons (#1225) ....1597
Toshiaki Omori and Tsuyoshi Horiguchi

A Model for Visual Selective Attention by Two-Layered Neural Network with Fitzhugh-Nagumo Neurons
(#1138) ..............................................................................................................................................1602
Katsuki Katayama, Masafumi Yano and Tsuyoshi Horiguchi
Membrane Dynamics and Single-Neuron Signal Processing (#1475) ........................................1607

Abel Sanchez, Victor Manuel Garcia, Alberto Perez De Vargas and Fivos Panetsos
Synchrony of Fast-Spiking Interneurons Interconnected by Gabaergic and Electrical Synapses (#1435) .....1612
Masaki Nomura, Tomoki Fukai and Toshio Aoyagi