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TECHNICAL REPORT

**AIR FORCE OFFICE OF
SCIENTIFIC RESEARCH**

GRANT NO. AFOSR-88-0258

**INTERNATIONAL NEURAL
NETWORK SOCIETY**

**Submitted by
Dr. Harold Szu
Treasurer/INNS**

INNS
First Annual Meeting
September 6-10, 1988

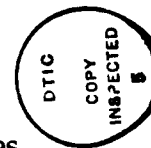
Special Supplement Issue
of
Neural Networks

Advance Program

contains

General Information
Daily Schedule Summaries
Detailed Daily Schedules
Abstracts of Papers
Index to First Authors of Papers

Boston Park Plaza Hotel
Boston, Massachusetts



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INNS First Annual Meeting

The 1988 First Annual Meeting of the International Neural Network Society (INNS) brings together over 2,000 academic scientists, engineers, students, government administrators, industrial commercializers, and financiers in an open forum for the advancement of the full spectrum of significant neural network research and development, from biology through technology.

Formed in 1987 in response to the extraordinary international interest in neural network research, INNS includes among its founders many of the most distinguished leaders of the field. By Spring, 1988, INNS membership had grown to over 2,000 of the field's most active researchers, from 34 countries and 47 states in the United States. These are the people who will determine the future of this strategic technology.

The INNS invites all those interested in the exciting and rapidly expanding field of neural networks to attend its 1988 Annual Meeting. The meeting includes plenary lectures, symposia, contributed oral and poster presentations, tutorials, commercial and publishing exhibits, government agency presentations, and social events.

Join us in Boston September 6-10, 1988!

INNS Annual Meeting Program Committee

- | | |
|---|---|
| Dr. Joshua Alspector,
<i>Bell Communications Research</i> | Dr. Bart Kosko,
<i>University of Southern California</i> |
| Dr. Shun-ichi Amari,
<i>University of Tokyo</i> | Dr. Daniel Levine,
<i>University of Texas at Arlington</i> |
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<i>Max-Planck Institute</i> |
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<i>University of Pennsylvania</i> |
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<i>Northeastern University</i> | Dr. Lance Optican,
<i>National Institutes of Health</i> |
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<i>Boston University</i> | Dr. David Parker,
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<i>California Institute of Technology</i> |
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<i>University of British Columbia</i> | Dr. Adam Reeves,
<i>Northeastern University</i> |
| Dr. John Daugman,
<i>Harvard University</i> | Dr. Thomas Ryan,
<i>SAIC</i> |
| Dr. David C. VanEssen,
<i>California Institute of Technology</i> | Dr. Jay Sage,
<i>MIT Lincoln Laboratory</i> |
| Dr. Federico Faggin,
<i>Synaptics</i> | Dr. Eric Schwartz,
<i>New York University</i> |
| Dr. Nabil H. Farhat,
<i>University of Pennsylvania</i> | Dr. Allen Selverston,
<i>University of California, San Diego</i> |
| Dr. Walter Freeman,
<i>University of California, Berkeley</i> | Dr. George Sperling,
<i>New York University</i> |
| Dr. Kunihiro Fukushima,
<i>NHK Laboratory</i> | Dr. David Stork,
<i>Clark University</i> |
| Dr. Lee Giles,
<i>AF Office of Scientific Research</i> | Dr. Harold Szu,
<i>Naval Research Laboratories</i> |
| Dr. Stephen Grossberg,
<i>Boston University</i> | Dr. David Tank,
<i>AT&T Bell Laboratories</i> |
| Dr. Morris Hirsch,
<i>University of California, Berkeley</i> | Dr. Wilfrid Veldkamp,
<i>MIT Lincoln Laboratory</i> |
| Dr. Scott Kelso,
<i>Florida Atlantic University</i> | Dr. William Warren,
<i>Brown University</i> |
| Dr. Daniel Kersten,
<i>Brown University</i> | Dr. Bernard Widrow,
<i>Stanford University</i> |
| Dr. Teuvo Kohonen,
<i>Helsinki University of Technology</i> | Dr. George Works,
<i>SAIC</i> |

Plenary and Invited Speakers by Session

Plenary Speakers

Tuesday, September 6

Bernard Widrow, Meeting Chairman
Stanford University

Wednesday, September 7

Stephen Grossberg, INNS President
Boston University
Nobuo Suga
Washington University

Thursday, September 8

Carver Mead
California Institute of Technology
Terrence Sejnowski
Johns-Hopkins University

Invited Speakers

Pattern Recognition Session

Eric Schwartz
New York University
Kunihiko Fukushima
NHK Laboratories
Teuvo Kohonen
Helsinki University of Technology
Gail Carpenter
Northeastern University

Network Analysis Session

Christoph von der Malsburg
*Max Planck Institut fur Biophysik-
Chemie*
Daniel Amit
Hebrew University
Bart Kosko
University of Southern California
Lee Giles
Air Force Office of Scientific Research

Cognition and Learning Session

James Anderson
Brown University
Geoffrey Hinton
University of Toronto
David Rumelhart
Stanford University
Walter Freeman
University of California, Berkeley

Neurobiology Session

Gunter Gross
North Texas State University
Gary Lynch
University of California, Irvine
Allen Selverston
University of California, San Diego
Max Cynader
University of British Columbia

Sensory-Motor Control and Robotics Session

Jacob Barhen
Jet Propulsion Laboratory
James Houk
Northwestern University
Lance Optican
National Institute of Health
Daniel Bullock
Boston University
Scott Kelso
Florida Atlantic University

Implementations: Optical and VLSI Session

Demetri Psaltis
California Institute of Technology
Dana Anderson
University of Colorado
Bernard Soffer
Hughes Research Laboratories
Harold Szu
Naval Research Laboratories
Jay Sage
MIT, Lincoln Laboratory

Applications Session

Michael Buffa
Nestor, Inc.
Wilfrid Veldkamp
MIT, Lincoln Laboratory
Thomas Ryan
SAIC
Robert Hecht-Nielsen
Hecht-Nielsen Neurocomputer Corp.

Vision Session

John Daugman
Harvard University
Steven Zucker
McGill University
George Sperling
New York University
Ennio Mingolla
Boston University

Grants

The International Neural Network Society
gratefully acknowledges
conference grants
provided to the INNS First Annual Meeting
by the

United States Government Agencies

listed below.

These grants have provided
crucial support
during this formative year of the Society,
and have also enabled
the INNS to provide
travel grants for students and young researchers
who will be presenting papers at this meeting.

*Air Force Office of Scientific Research
Defense Advanced Research Projects Agency
National Science Foundation
Oak Ridge National Laboratory
Office of Naval Research*

Corporate Gifts

The International Neural Network Society
gratefully acknowledges
the financial sponsorship of

Hughes Aircraft Company

in the arrangements for this First Annual Meeting of the INNS,
as well as the interest and support provided
by the many

Neural Network Researchers

within Hughes.

Cooperating Societies

The societies listed below have generously agreed to cooperate with the INNS in this meeting.

American Mathematical Society
Association for Behavior Analysis
Cognitive Science Society
IEEE Computer Society
IEEE Control Systems Society
IEEE Engineering in Medicine and Biology Society
IEEE Systems, Man and Cybernetics Society
Optical Society of America
Society for Industrial and Applied Mathematics
Society for Mathematical Biology
Society of Photo-Optical Instrumentation Engineers
Society for the Experimental Analysis of Behavior

Organizing Committee for Cooperating Societies:

The following people were instrumental in organizing the cooperation of these societies:

Mark Kon (*Chairman*)
Joseph Bronzino
William Freedman
Morris Hirsch
William Hutchinson
Simon Levin
Daniel Levine
Herbert Rauch
David Rumelhart
Jay Sage
Bernard Soffer
Harold Szu

Daily Schedule Summaries
for the
First Annual Meeting
of the
International Neural Network Society

The following pages contain daily summaries
of the activities at this meeting.

Detailed Daily Schedule
for the
First Annual Meeting
of the
International Neural Network Society

The following pages contain detailed daily schedules
of the activities at this meeting.

A Day of Tutorials
Imperial Ballroom
Tuesday, September 6, 1988

Vision and Image Processing	8:00 AM
John Daugman <i>Harvard University</i>	
Speech and Language Processing	9:00 AM
Teuvo Kohonen <i>Helsinki University of Technology</i>	
Break	10:00 AM to 10:30 AM
Sensory-Motor Control and Robotics	10:30 AM
Stephen Grossberg <i>Boston University</i>	
Pattern Recognition, Associative Learning and Self-Organization	11:30 AM
Gail A. Carpenter <i>Northeastern University</i>	
Lunch Break	12:30 PM to 1:30 PM
Cognitive Psychology for Information Processing	1:30 PM
David Rumelhart <i>Stanford University</i>	
Local Circuit Neurobiology	2:30 PM
Allen Silverston <i>University of California, San Diego</i>	
Break	3:30 PM to 4:00 PM
Non-Linear Dynamics for Neural Networks	4:00 PM
Morris Hirsch <i>University of California, Berkeley</i>	
Applications, Combinatorial Optimization and Implementations	5:00 PM
Demetri Psaltis <i>California Institute of Technology</i>	

Reception and Plenary Session
Georgian Room / Imperial Ballroom
Tuesday, September 6, 1988
Evening

Opening Welcome Reception, Georgian Room..... 6:00 PM to 7:30 PM
(Hors d'oeuvres will be served; cash bar available. All meeting registrants are welcome.)

Plenary Session, Imperial Ballroom..... 7:30 PM to 9:30 PM

Official Opening of the First Annual Meeting of the INNS..... 7:30 PM
Stephen Grossberg, President of INNS
Boston University

Learning Systems and Their Applications..... 8:00 PM
Bernard Widrow
Stanford University

Pattern Recognition Session
Imperial Ballroom
Wednesday, September 7, 1988
Morning

Title To Be Announced	8:00 AM
Schwartz, Eric New York University	
Analysis of the Process of Visual Pattern Recognition by the Neocognitron	8:30 AM
Fukushima, Kunihiko NHK Science and Technical Research Laboratories	
Problems in Practical Pattern Recognition	9:00 AM
Kohonen, T. Helsinki University of Technology	
Neural Network Modules for Adaptive Resonance Theory (ART) Architecture	9:30 AM
Carpenter, Gail A. Northeastern University and Boston University	
A Neural Network Model for Sequential Tasks	10:00 AM
Gallant, Stephen I. Northeastern University	
State Recurrence Learning	10:20 AM
Rosen, B.E., Goodwin, J.M. and Vidal, J. J. University of California, Los Angeles	
Learning Decision Trees Using Parallel Sequential Induction Network	10:40 AM
Sun G.Z.; Chen, H.H. and Lee, Y.C. University of Maryland	
Comparing Neural Networks and Data Analysis	11:00 AM
Gallianari, P.; Thiria, S. and Soulie, F. Fogelman Universite de Paris	
Statistical Pattern Recognition with Neural Networks	11:20 AM
Barna, G.; Chrisley, R. and Kohonen, T. Helsinki University of Technology	
Pattern Recognition as Minimization, A New Feedback Technique	11:40 AM
Brady, M. *; Nguven, H.*; Raghavan, R.* and Slawny, J.** Lockheed R & DD* and Virginia Polytechnic Institute**	
On Comparing Neural Net Training Paradigms via Graded Pattern Recognition Tasks	12:00 PM
Lendaris, George G. Portland State University	
A Relaxation Model for Pattern Classification and Association	12:20 PM
Sayeh, M.R. and Pourboghrat, F. Southern Illinois University	
Lunch Break	12:40 PM to 2:00 PM

Network Analysis Session
Georgian Room
Wednesday, September 7, 1988
Morning

Object Recognition in Dynamical Network Architecture	8:00 AM
von der Malsburg, C. Max Planck Institut fur Biophysik-Chemie	
Title To Be Announced	8:30 AM
Amit, Daniel Hebrew University	
Title To Be Announced	9:00 AM
Kosko, Bart University of Southern California	
Computational Advantages of Higher Order Neural Networks	9:30 AM
Giles, C.L. Bolling AFB Griffin, R.D. and Maxwell, T. Naval Research Laboratory	
Terminal Attractors in Neural Networks	10:00 AM
Zak, Michail California Institute of Technology	
Input-Output Characteristics for a Class of Laterally Inhibited Graded Neural Network	10:20 AM
Lemmon, Michael and Kumar, B.V.K. Vijaya Carnegie Mellen University	
A Convergence Theorem for the Modified Delta Rule	10:40 AM
Sethares, W.A. University of Wisconsin	
Selforganization and Information Processing of Neural Networks	11:00 AM
Babloyantz, A.; Destexhe, A. and Sepulchre, J.A. Universite Libre de Bruxelles	
Design Method for Lateral Inhibition Networks That Is Provably Stable in the Presence of Circuit Parasitics	11:20 AM
Standley, D., and Wyatt, J.L. Jr Massachusetts Institute of Technology	
Gensep: A Multiple Neural Network Learning System with Modifiable Network Topology	11:40 AM
Reilly, Douglas L.; Scofield, C.; Cooper, L.N. and Elbaum, C Nestor, Inc.	
Generalization in Digital Functions	12:00 PM
Huyser, Karen A. and Horowitz, Mark A. Stanford University	
Interacting Neural Populations	12:20 PM
Eilbert J.L. and Guez, A. Drexel University	
Lunch Break	12:30 PM to 2:00 PM

Pattern Recognition Session
Imperial Ballroom
Wednesday, September 7, 1988
Afternoon

Fast Learning of Arbitrarily Shaped Decision Regions in Neural Networks.....	2:00 PM
Hayduk, John W. and Fong, Yu-Shan Clarkson University	
Constraints on Generalization by Adaptive Networks.....	2:20 PM
Pavel, M.; Jimison, H and Moore, Rebecca Stanford University	
Generic Contour Features in Neural Network Pattern Recognition	2:40 PM
Walters, Deborah and Krishnan, Ganapathy State University of New York	
Classification of Tactical Targets with Neural Nets.....	3:00 PM
Rogers, S.K.; Troxel, S.E.; Ruck, D.W.; Kabrisky, M. Wright-Patterson Air Force Base	
An Analysis of Competing Neural Network Knowledge Representation Strategies.....	3:20 PM
Bastani, F.B.*; Iyengar, S.S.** and Gulati, S.** *University of Houston and **Louisiana State University	
A Study of Scaling and Generalization in Neural Networks.....	3:40 PM
Ahmad, S. and Tesauro, G. University of Illinois at Urbana-Champaign	
Neural Nets as Piecewise Linear Classifiers: New Algorithms.....	4:00 PM
Barnard, E.; Botha, E. and Casasent, D. Carnegie Mellon University	
Neural Networks as Classifiers of Noisy Patterns: An Experimental Comparison with Bayesian Classifiers.....	4:20 PM
Zink, W.T.; Vogl, T.P. and Mangis, J.K. Environmental Research Institute of Michigan	
A New Pattern Classifier Motivated by Brain Maps.....	4:40 PM
Rojer, Alan and Schwartz, Eric New York University	
Break.....	5:00 PM to 5:20 PM

Network Analysis Session
Georgian Room
Wednesday, September 7, 1988
Afternoon

Optimal Unsupervised Learning.....	2:00 PM
Sanger Terence MIT AI Laboratory	
The Stability of Sustained Oscillations in Symmetric Cooperative-Competitive Neural Networks: A Disproof of A Conjecture About Content Addressable Memory	2:20 PM
Cohen, Michael Boston University	
A Bifurcation Theory Approach To The Programming of Steady State or Periodic Attractors and Their Bifurcations in Dynamic Analog Neural Networks.....	2:40 PM
Baird, Bill University of California, Berkeley	
Neural Dynamics of Adaptive Timing and Temporal Discrimination During Associative Learning.....	3:00 PM
Grossberg, S. and Schmajuk, N. Boston University	
Spontaneous Symmetry-Breaking Energy Functions, Orientation Selective Cortical Cells, and Hypercolumnar Cell Assemblies	3:20 PM
Yuille, Alan and Kammen, Daniel M. Harvard University	
Madaline Rule II: A Training Algorithm for Neural Networks	3:40 PM
Winter, Capt. Rodney USAF Widrow, Bernard Stanford University	
A Comparative Study of Neural Network Classifiers.....	4:00 PM
Menon, M.M. and Kolodzy, P.J. Massachusetts Institute of Technology	
Exploring the Dynamics of Neural Systems.....	4:20 PM
Travis, B. and Gremillion, M. Los Alamos National Laboratory	
"Fractal Chaos" A New Neural Holographic Model.....	4:40 PM
Perez, J.C. IBM France Bertille, J.M. USTL/CRIM Lab-Montpellier University	
Break.....	5:00 PM to 5:20 PM

**Associative Learning
Poster Session
Stanbro Room**
*Wednesday, September 7, 1988
Morning*

Rule-Driving by a Neural Multicategory Classifier

Baran, Robert H. and Palmer, James R.
Naval Surface Warfare Center

Segmentation of True Color Microscopic Images Using A Back Propagation Neural Network

Dayhoff, Ruth E. and Dayhoff, Judith E.
Judith Dayhoff & Associates, Inc.

A Study of the Simultaneous Delta Rule

Fong, Yu-Shan and Jensen, James E.
Clarkson University

Spatio-Temporal Associative Memory and a High-Order Correlation Neuronal Network

Gao, Qian and Liu, Zili
Academia Sinica, Beijing, PRC

A Neuronlike Network Using Hierarchical Learning Algorithm for Multitasking Control of an Unknown Object

Gawronski, R.R. and Preston, J.
University of West Florida

Neural 'Selective' Processing and Learning

Gelband, Patrice
Advanced Decision Systems
Tse, Edison
Stanford University

Neural Networks for Adaptive Internal Correlations in Associative Memory

Graupe, Daniel and Uth, John
Univ. of Illinois at Chicago

Learning Generalization in Simple Linear Discriminant Networks

Greene, Ronald L.
Northeastern University

Conjunctoid Learning and Performance Algorithms

Jannarone, R.J.; Yu, K.F. and Takefuji, Y.
University of South Carolina

The Correlational Associative Memory Realizes Hebbian Learning

Karayannis, N.B. and Venetsanopoulos, A.N.
University of Toronto

A Neural Network Model of Pain Persistence

Katz, B.
University of Illinois

Error-Correcting Neural Networks

Kinsner, J.M.
*University of Alabama**
Caulfield, H.J.* and Hester, C. **
*Teledyne Brown Engineering***

Analysis of Feedforward Networks That Dynamically Learn

Kuh, A.
University of Hawaii

**Associative Learning
Poster Session
Stanbro Room
Wednesday, September 7, 1988
Morning (continued)**

A PDP Implementation of a Psychological Model of Memory

Levy, J. and Stenning, K.
University of Edinburgh

A Comparison of Neural Classifier System Approaches to the Multiplexer Problem

Liepins, G.E.
Oak Ridge National Laboratory

Perceptron Learning on Hopfield Net

Lui, H.C.
National University of Singapore

Design Graph Search Problems with Learning: A Neural Network Approach

Mei, Gee-Gwo
*North Carolina State University**
Liu, Wentai * and Chen, Su-shing**
*University of North Carolina***

Back Propagation for Perspective-Invariant Pattern Recognition in SAR Imagery

Moya, M.M.; Fogler, R.J. and Hostetler, L.D.
Sandia National Laboratories

Learning Algorithms for Probabilistic Neural Nets

Myers, Catherine and Aleksander, Igor
Imperial College

Improving the Learning Rate of Neural Networks

Nelken, Izzy
Rutgers University

Auto-Encoding with Entropy Constraints

Nowlan, Steven J.
University of Toronto

Noise Immunity of Generalized Delta Rule Learning

Pemberton, Joseph C. and Vidal, Jacques
University of California, Los Angeles

Learning, Regularization and Splines

Poggio, T.
MIT AI Laboratory

Backward Conditioning: A Neural Network Model Which Exhibits Both Excitatory and Inhibitory Conditioning

Ricart, Richard
W-PAFB

Investigation of a Layered Network As An Associative Memory

Richards, Gareth D.
University of Edinburgh

Associate Retrieval and Restoration of Data in Neural Networks

Salu, Yehuda
Howard University

Associative Learning
Poster Session
Stanbro Room
Wednesday, September 7, 1988
Morning (continued)

An Algorithm for Encoding An Arbitrary Number of Patterns in a System of Discrete Bidirectional Associative Memories

Simpson, Patrick
General Dynamics Electronics Division

The Significance of Underlying Correlations in the Training of a Layered Net

Smieja, F.J.
The King's Buildings

Increased Effectiveness of Learning by Local Neural Feedback

Sobajic, Dejan; Lee, Dennis T. and Pao, Yoh-Han
Case Western Reserve University

Extended Hopfield Neural Network: A Complementary Approach

Tai, Heng-Ming
University of Tulsa
Jong, Tai-Lang
Texas Tech University

Training Multi-Layered Neural Networks with T.R. Based Algorithm

Wang, Shengrui
TIM.3/INPG

Applying Genetic Algorithms to Neural Network Problems

Whitley, Darrell
Colorado State University

Hierarchical Neural Networks with Exponential Storage

Willcox, C.R.
Solid State Technology Center

**Cognitive Information Processing
Poster Session
Park Plaza Castle
Wednesday, September 7, 1988
Morning**

Connectionist Theories, ART and Cognitive Potentials

Banquet, J.P.
LENA-CNRS La Salpetriere

Committing Facts to Long Term Memory

Becker, L. and Immes, L.
Worcester Polytechnic Institute

Attractor Transitions: A Basis for Sequential Processing in Neural Networks?

Bell, Tony
Institut fur Informatik

Attention in ANN Knowledge-Processing

Cruz, C.A.
Plexus Systems

Computer Simulation of Event Related Potentials During Voluntary Cognition

Deshmukh, Vinod
*Univ. of Florida, Jacksonville**
Russo, Louis S. Jr.* and Boules, Adel**
*Univ. of North Florida, Jacksonville***

Using Neural Networks for Generalization Problems

Dutta, Soumitra, Shekhar, Shashi
Univ. of Calif.- Berkeley

The E-Machines: Associative Neural Networks as Nonclassical Symbolic Processors

Eliasberg, V.
Universal Learning Systems

Executive Control in PDP System: Automatization of Task Performance and Mindwandering

Fookson, Jeffrey E.
New York University
Antrobus, John
The City College of New York

A Connectionist Approach to Mental Representation

Gonzales, Maria E. Quilici
University of Essex and Universidade Estadual (Paulista, Brazil)

An Action Function Approach to Network Dynamics and the Meaning of Representations

Grant, F.E. and Lumsden, C.J.
University of Toronto

Two Storage Mechanisms in Random Network System: Probabilistic Model of Memory

Hara, Hiroaki
Tohoku University

Understanding the Structure of Causal Events

Hayes, T.; Lee, E.S. and Lumsden, C.J.
University of Toronto

Neural Networks as Theories of Mind

Hunter, Lawrence
Yale University

**Cognitive Information Processing
Poster Session
Park Plaza Castle
Wednesday, September 7, 1988
Morning (continued)**

An Associative Memory Model Based on a Quantification Method

Kato, K.

NTT Human Interface Laboratories

Nakane, K.

ATR Auditory and Visual Perception Laboratories

Logic and Reasoning with Neural Models

Kurfess, Franz

Technische Universitat Munchen

A Hybrid Model of Skill Acquisition in Solving Physics Problems

Lamberts, K.

University of Leuven/Louvain

Normal and "Frontally Damaged" Reactions to Novelty in a Gated Dipole Network

Levine, D.S. and Prueitt, P.S.

University of Texas at Arlington

The Learning of Regularities in Binary Data

Loos, H.G.

Laguna Research Laboratory

Computational Power of Cognition

Pilgrim, Robert A.

SRS Technologies

Cognitive Action Theory: An Action-Based Paradigm for Connectionism

Roitblat, H. L.

University of Hawaii

A PDP System for Paraphrasing Routing Knowledge Vignettes

Sharkey, N.E.

University of Essex

Neural Network Simulation and Pandemonium

Suzuki, Kunio and Aoyama, Chiaki

Sophia University (Japan)

Use of Neural Nets to Analyse Code Execution Patterns

Wagner, Michal

Northwestern University

Three Neural Models Which Process Temporal Information

Wang, Deliang and King, Irwin K.

USC

The Primacy of the Abstract: The Link Between Theoretical Psychology and Neuroscience

Warner, S.D. and Bailey, C.S.

Saint Mary's College

Implementing Default Knowledge in Neural Networks

Yager, Ronald

Iona College

**Neurobiology
Poster Session
Stanbro Room
Wednesday, September 7, 1988
Afternoon**

A Simple Model for Spike-Train-Output Neurons

Atkinson, R.
Arcon Corporation

Global Changes in Entropy and in Spatial Organisation of Activity

Axelrad, H.; Bernard, C. and Giraud, B.
Laboratoire de Physiologie CHU Pitie and (GB)

Nonlinear Systems Analysis of Network Properties of the IN VIVO Perforant Path-Dentate Gyrus

Berger, T.W.; Port, R.L.; Balzer, J.R; and Sciabassi, R. J.
University of Pittsburgh

Cortical Columns as Automata

Burnod, Y.
Institut Pasteur

Spatiotemporal Dynamics of a Three-Dimensional Network of Neural 'Clouds'.

Buskirk, Daniel R.
The Rockefeller University

Functional Circuitry in the Rat Somatosensory Cortex: Inter-actions Within Simultaneously Recorded Neuronal Ensembles

Chapin, John K.; Shin, Hyung-Cheul, and Patel, Ishvarial M.
Hahnemann University

Learning Abilities for a Cerebellar Purkinje Unit

Chauvet, G.
Laboratoire de Biologie Theorique

Endogenous Bursting and Chaos in a Neuronal Membrane Model: A Step Toward Understanding the Neural Network Mechanisms

Chay, Teresa Rae
University of Pittsburgh

What Is The Code?

Colbert, C. M. and Levy, W.B.
Univ. of Virginia School of Medicine

Neural Network Modelling of Velocity Estimation During Off-Vertical Axis Rotation (OVAR)

Fanelli, Robert; Schnabolk, Charles and Raphan, Theodore
Brooklyn College of CUNY

A Proposed System of Inhibition in the Deeper Layers of the Superior Colliculus

Fujita, Masahiko
Nagasaki Institute of Applied Science

An Associative Memory Network for Identifying Mingling Odors

Getz, Wayne M.
University of California, Berkeley

A Nonlinear Layered Model of Cortical Dynamics

Giannakopoulos, Fotios; Mallot, Hanspeter A.
Johannes Gutenberg-Universitat

**Neurobiology
Poster Session
Stanbro Room
Wednesday, September 7, 1988
Afternoon (continued)**

**Nonlinear Systems Analysis of the IN VITRO Perforant Path-Dentate Gyrus:
Physiological Basis of Hippocampal Network Properties**

Harty, T.P.; Berger, T.W.; Scabassi, R.J. and Barrionuevo, G.
University of Pittsburgh

Neural Mechanisms in Mental Disorders

Hestenes, D.
Arizona State University

Receptive Field Density of Y Cells Estimated by a Model of Human Retina

Inui, Toshio
ATR Auditory and Visual Perception Res. Labs
Miyake, S. and Kani, K.
Shiga University of Medical Science, Otsu, Japan

Neural Network Formation in an Aggregate of Dissociate Hydra Cells

Itayama, T.
*Tohoku University***
Koizumi, O* and Sawada, Y **
*Fukuoka Womens College**

Concept of Neuro-Automata: 2

Kadri, Rachid
Houston, TX

Sub-Neural Learning Networks

Koruga, D.L.
University of Belgrade

The Metastable and Unstable States in the Brain

Kryukov, V.
USSR Academy of Sciences

Rule-Based Growth of FFT Butterfly Networks

McKee, George
Northeastern University

Network Model of Ocular Domonance Column Formation: Analytical Results

Miller, K.D.
UCSF
Keller, J.B. and Stryker, M.P.
Stanford University

A Local Circuit Simulation Tool

Pfeiffer, H.D. and Fields, C.A.
New Mexico State University

Stochastic Connectivity in the Retinal Ganglion Cell Receptive Field:

A Discrete Spatial Model

Sandini, G. and Tistarelli, M.
University of Genoa

An External Network Model of the Hippocampal Formation

Scabassi, R.J.; Krieger, D.; Solomon, J.; Levitan, S.; Barrionuevo G. and Berger, T.
University of Pittsburgh

**Neurobiology
Poster Session
Stanbro Room**
*Wednesday, September 7, 1988
Afternoon (continued)*

**Movement Related Modulation of Sensory Transmission in Many Neuron Ensembles
Recorded Simultaneously in Somatosensory Cortex and Thalamus: Dynamic Changes in
Functional Connectivity**

Shin, H-C. and Chapin, J.K.
Hahnemann University

**Molecular Correlates of Neural Network Mediating Touch Sensitivity in *Caenorhabditis
Elegans***

Siddiqui, Shahid S.
Toyohashi University of Technology

**Correlation of Multiple Neuronal Spike Trains Using the Back-Propagation Error
Correction Algorithm**

Tam, D.C.; Perkel, D.H. and Tucker, W.S.
University of California, Irvine

**Neural Principles of Associative Learning: Reconstruction of Ionic Currents
in the *Hermisenda* Type B Photoreceptor**

Usui, Shiro
*Toyohashi University of Technology**
Ikeno, H; Sakakibara, M* and Alkon, Daniel L.**
*Lab of MCNB, NINCDS, NIH***

Neural Network Models of an Escape Response

Wheeler, B.C. and Smith, S.R.
University of Illinois

**Combinatorial Optimization
Poster Session
Park Plaza Castle
Wednesday, September 7, 1988
Afternoon**

An Unified Computational Framework for Neural Network Models

Anderson, James R.
University of Texas at Austin

The Complexity of Reliability and Constraint Satisfaction In Neural Networks

Berman, P.; Parberry, I. and Schnitger, G.
The Pennsylvania State University

Microcanonical Annealing on Neural Networks

Cattaneo, G. and Cesa-Bianchi, N.
Universita di Milano

Sigmoidic Linear and Non-Linear Optimization Algorithms

Culioli, J.-C. and Protopopescu, V.
Oak Ridge National Laboratory

Scaling Techniques for Neural Algorithms

Cuykendall, Robert and Reese, Roy
University of Iowa

Computing All Invariant States of A Neural Network

De Moor, Bart; Vandenberghe, Lieven and Vandewalle, Joos
Katholieke Universiteit Leuven

Scalability Issues in Neural Networks

Fogaca, Marcelo
*MIT AI Lab**
Kramer, Alan** and Moore, Barbara *
*UC Berkeley***

Constraint Optimization Neural Network for Adaptive Early Vision

Furman, B.
UCLA
Liang, J.* and Szu, H.**
Eastman Kodak and Naval Research Labs***

Dynamical Neural Schema for Quadratic Discrete Optimizations Problems

Goles, E.; Hernandez, G. and Matamala, M.
University de Chile

On Learning Through Competition

Heath, David
Cornell University
Diegert, Carl
Sandia National Laboratories

The Importance of Being Synchronous in Neural Networks

Kamgar-Parsi, Behzad and Kamgar-Parsi, Behrooz
University of Maryland

Simultaneous Fitting of Several Curves to Point Sets Using Neural Networks

Kamgar-Parsi, Behzad
*University of Maryland***
Kamgar-Parsi**, Behrooz; Gualtieri**, J.A. and Devaney, J.E.*
*NASA Goddard Space Flight Center**

**Combinatorial Optimization
Poster Session
Park Plaza Castle
Wednesday, September 7, 1988
Afternoon (continued)**

Neural Computing Approach to Number Theory Problem

Marudarajan, Anaikuppam R.
California State Polytechnic University
Szu, Harold
Naval Research Laboratory

Global Combinatorial Optimization by Neural Networks

Noetzel, Andrew
Polytechnic University
Graziano, Michael J.
Covidea

Recursive Auto-Associative Memory

Pollack, Jordan B.
New Mexico State University

A Learning Rule for Neural Networks with an Application to an Optimization Problem

Sayegh, Samir
Indiana-Purdue University
Tenorio, Manoel F.
Purdue University

Stochastic Approximation Algorithm With Function Smoothing vs Simulated Annealing

Styblinski, M.A. and Tang, T.-S.
Texas A & M University

Redundant Coding for Fault Tolerant Computing on Hopfield Network

Tanaka, Hideo
*Tokyo Electric Power Company**
Matsuda, S.*; Ogi, H.*; Izui, Y.**; Taoka N.**; Sakaguchi, T.**
*Mitsubishi Electric Corporation***

A Neural Network for the Optimization of Communications Network Design

Vichniac, G.; Lepp, M. (Gardner) and Steenstrup, M.
BBN Communications Corporation

A Neural Network Algorithm for the Target-Weapon-Assignment Problem

Wacholder, E.; Han, J. and Mann, R.C.
Oak Ridge National Laboratory

A Case Study of Solving Optimization Problems Using Neural Networks

Xu, X.; Tsai, W.T. and Huang, N.K.
University of Minnesota

Dynamic Tunneling Algorithm and Simulated Annealing Circuit for Global Optimization.

Yao, Yong
University of California at Berkeley

Plenary Session
Imperial Ballroom
Wednesday, September 7, 1988
Evening

Plenary Session, Imperial Ballroom..... 5:30 PM to 7:30 PM

Presidential Address..... 5:30 PM
Stephen Grossberg, President of INNS
Boston University

Neural Computation for Auditory Imaging..... 6:30 PM
Nobuo Suga
Washington University

Cognition and Learning Session
Imperial Ballroom
Thursday, September 9, 1988
Morning

Programming Neural Networks	8:00 AM
Anderson, James A.; Markman, A.B.; Viscuso, S.R. and Wisniewski, E.J. Brown University	
Title To Be Announced	8:30 AM
Hinton, Geoffrey University of Toronto	
Learning and Generalization in Brain-Style Computation	9:00 AM
Rumelhart, David Stanford University	
Neurodynamics of Pattern Recognition in Biological Neural Networks	9:30 AM
Freeman, W.J. University of California, Berkeley	
Back-Propagation is Significantly Faster if the Expected Value of the Source Unit is Used for Update	10:00 AM
Samad, Tariq Honeywell CSDD	
Learning Algorithms for Neural Networks with Ternary Weights	10:20 AM
Chiueh, T.D.; Goodman, R.M. California Institute of Technology	
Learning Contiguity with Layered Neural Networks	10:40 AM
Solla, Sara A. AT&T Bell Laboratories	
Shaping Schedules as a Method for Accelerated Learning	11:00 AM
Wieland, Alexis P. and Leighton, Russell The MITRE Corporation	
A Composite Holographic Associative Recall Model (Charm) and Recognition Failure of Recallable Events	11:20 AM
Metcalf, Janet University of California, San Diego	
Speedy Alternatives to Back Propagation	11:40 AM
Moody, John and Darken, Chris Yale University	
Using Curvature Information to Improve Back-Propagation	12:00 PM
Cun, Yann Le University of Toronto	
Representation Properties of Multilayer Feedforward Networks	12:20 PM
Moore, B. and Poggio, T. MIT AI Laboratory	
Lunch Break	12:40 PM to 2:00 PM

Neurobiology Session
Georgian Room
Thursday, September 8, 1988
Morning

Multielectrode Burst Pattern Feature Extraction from Mammalian Networks in Culture	8:00 AM
Gross, G.W. University of North Texas Hightower, M.H. and Kowalski, J.* University of North Texas, Univ. of Texas, Arlington	
Title To Be Announced	8:30 AM
Lynch, Gary University of California, Irvine	
Computational Data Bases from the Lobster Stomatogastric and Other Small Neural Networks	9:00 AM
Selverston, Allen University of California, San Diego	
Some Design Features of Visual Cortex	9:30 AM
Cynader, Max S. University of British Columbia	
Computer-Aided Research Into A Natural Neural Network	10:00 AM
Ross, M.D.; Meyer, G.**; Lam, T.**; Or, W.**; and Cutler, L.* NASA Ames Research Center*, and Sterling Software**	
Specificity of Synaptic Connections in the Cerebral Cortex	10:20 AM
Keller, A. and White, E. I. Ben Gurion University	
Pacemakers and Cell Assemblies	10:40 AM
Bremner, F.J. and Yost, M. Trinity University	
Temporal Correlation of Multiple Neuronal Spike Trains Using the Back-Propagation Error Correction Algorithm	11:00 AM
Tam, D.C.; Perkel, D.H. and Tucker, W.S. University of California, Irvine	
Models of Simulation of Real Neural Networks	11:20 AM
Hartline, David K. University of Hawaii	
Tactile Information Processing: A Back-Propagation Model of Pattern Recognition in the Human Somatosensory System	11:40 AM
Grajski, Kamil A. Coleman Labs	
High-Speed Imaging of Electrical Activity: Watching the Brain Think On MTV/2	12:00 PM
Nash, P.L.; Muljadi, P.; Wayner, M.J. and Senseman, D. M. University of Texas at San Antonio	
Network Model of Ocular Dominance Column Formation: Computational Results	12:20 PM
Miller, K.D. UCSF Stryker, M.P. and Keller, J.B. Stanford University	
Lunch Break	12:40 PM to 2:00 PM

Cognition and Learning Session
Imperial Ballroom
Thursday, September 9, 1988
Afternoon

Modular Neural Networks for Shape And/Or Location Recognition	2:00 PM
Anzai, Yuichiro and Shimada, Takeshi	
<i>Keio University</i>	
Comparing Generalization by Humans and Adaptive Networks	2:20 PM
Pavel M.; Gluck, Mark A. and Henkle, Van	
<i>Stanford University</i>	
Multidimensional Scaling and Neural Network Models of Human Cognition	2:40 PM
Borkum, J. and Martindale, C.	
<i>University of Maine</i>	
Benchmarking the Performance of Backpropagation and Counterpropagation Networks	3:00 PM
Caudill, Maureen	
<i>Adaptics</i>	
Commonsense Reasoning in Conposit, A quasi-Connectionist Register-Array Model	3:20 PM
Barnden, J.A.	
<i>New Mexico State University</i>	
Exemplar Versus Prototype Network Models for Concept Representation	3:40 PM
Matheus, Christopher J.	
<i>University of Illinois</i>	
Sequential Processing by Overlap and Fatigue of Memories	4:00 PM
Schreter, Zoltan	
<i>Universitat Zurich</i>	
A Dynamic Pattern Theory of Learning and Recall	4:20 PM
Schoner, G. and Kelso, J.A.S.	
<i>Florida Atlantic University</i>	
Break	4:40 PM to 5:10 PM

Neurobiology Session
Georgian Room
Thursday, September 8, 1988
Afternoon

Population Coding of Two-Dimensional Saccades in the Brain Stem	2:00 PM
Fujita, Masahiko <i>Nagasaki Institute of Applied Science</i>	
Formal Analysis of Aggregate Function of Layer II Cerebral Cortex	2:20 PM
Granger, Richard; Ambros-Ingerson, Jose and Lynch, Gary <i>University of California, Irvine</i>	
Nonlinear Dynamical Modeling of Speech Using Neural Networks	2:40 PM
Tishby, Naftali <i>AT&T Bell Labs</i>	
A Neural Model of the Mechanisms Underlying Infant Perception of Voice-Onset Time	3:00 PM
Pont, M.J. <i>University of Southampton (England)</i>	
Break	3:20 PM to 3:40 PM

Speech Session
Georgian Room
Thursday, September 8, 1988
Afternoon

Learning Vector Quantization.....	3:40 PM
Kohonen, T. <i>Helsinki University of Technology</i>	
A Link Between Markov Models and Multilayer Perceptrons.....	4:00 PM
Bourlard, H. and Wellekens, C.J. <i>Philips Research Laboratory (Belgium)</i>	
Hiertalker: A Default Hierachy of High Order Neural Networks	
That Learns to Read English Aloud.....	4:20 PM
An, Z.G.; Mniszewski, S.M.; Lee, Y.C.; Papcun, G. and Doolen, G.D. <i>Los Alamos National Laboratory</i>	
Phoneme Recognition with a Neural Network: Comparisons of Acoustic	
Representations Including Those Produced by an Auditory Model.....	4:40 PM
Treurniet, W.C. <i>Communications Research Centre</i> Hunt, M.J.* Lefebvre, C.* and Jacobson, Z.** <i>National Research Council of Canada*, Carleton University**</i>	

**Speech
Poster Session
Stanbro Room
Thursday, September 8, 1988
Morning**

Effects of Network Topology on Speech Categorization

Anderson, Sven; Merrill, John and Port, Robert
Indiana University

Towards A Connectionist Model of Italian Morphology

Arbitrio, Alessandro
Istituto Psicologia CNR & AI Lab Selenia Roma, Italy
Delogu, Cristina
Fondazione Ugo Bordoni Roma, Italy

A Sticky-Bit Approach for Learning to Represent State

Bachrach, Jonathan R.
University of Massachusetts

**Automatic Detection of Speech Properties by the Use of Neural Networks
and Human Auditory System Model**

Bengio, Yoshua; Cosi, Piero and DeMori, Renato
McGill University

Dynamical Networks for Speech Development

Byrne, W. and Shamma, S.
University of Maryland

**Neural Models for Temporal Encoding of Information by the Auditory Periphery
and for Temporal Processing in the Anteroventral Cochlear Nucleus of Cat**

Carney, L.H.
University of Wisconsin-Madison

Noun Compound Understanding Using Neural Networks

Charny, M.
The MITRE Corporation

Speech Separation with Artificial Neural Networks

Chien, D.; Featherstone, M; Min, K. and Rogers, C.
East Texas State University

Neural Network as Generalized Transversal Filters

Chung, Min I.
AT&T Bell Laboratories

Non-Linear Extension of the McGill-Goldberg Counting Model

Hellman, William S.
Boston University
Hellman, R.P.
Northeastern University

Random Field and Tonotopy: Simulation of an Auditory Neural Network

Herve, T. and Dérnongéot, J.
Institut de la Communication Parlée, I.N.P.G.

Phonetic Discrimination Experiments with a Spatiotemporal Recognition Network

Hudak, Michael J.
Siemens Corporate Research and Support, Inc

A Learning Mechanism for the Identification of Hidden Structures in Signal Sets

Intrator, Nathan and Seebach, Bradley S.
Brown University

**Speech
Poster Session
Stanbro Room**
*Thursday, September 8, 1988
Morning (continued)*

- Vowel-Feature Extraction from Cochlear Vibration Using Neural Networks**
Irino T. and Kawahara, H.
NTT Basic Research Laboratories
- Learning to Read Aloud**
Joglekar, Umesh Dwarkanath
NASA Ames Research Center
- Experiments for Isolated-Word Recognition with Single-And Multi-Layer Perceptrons**
Kammerer B. and Kupper, W.
Siemens AG
- Abilities and Limitations of a Neural Network Model for Spoken Word Recognition**
Kurogi, Shurichi
Kyushu Institute of Technology
- A PDP Approach to Deterministic Natural Language Parsing**
Kwasny, Stan C.
Washington University
- A Neural Network Approach to Speech Recognition**
Lee, Y.C.; Chen, H.H. and Sun, G.Z.
University of Maryland
- Representation, Time, Scale, and Neural Computation**
Malloch, Mike
University of Edinburgh
- Computation of Temporal Pattern Primitives in a Neural Net for Speech Recognition**
Mueller, Paul
University of Pennsylvania
- A High Confidence Voice Interactive Hybrid Neural System for Learning**
Murdock, Jane Y.
University of New Orleans
Abolrous, Sam A.; Liang, Enju and Hussein, Abdo A.
Technology International Incorporated
- Analysis of a Neural Network Algorithm for Vector Quantization of Speech Parameters**
Naylor, J. and Li, K.P.
ITT Defense Communications Division
- Speaker Recognition Using Kohonen's Self-Organizing Feature Map Algorithm**
Naylor, J.; Higgins, A.; Li, K.P. and Schmoldt, D.
ITT Defense Communications Division
- One Trial Learning of Stimulus Sequences in a Connectionist Network**
Nolfi Stefano
Fondazione Sigma Tau
Parisi, Domenico
Istituto di Psicologia C.N.R., Roma
- Decision Rules for Perception of Species-Specific Syllables in Song Sparrows and Swamp Sparrows**
Okanoya, Kazuo and Dooling, Robert J.
University of Maryland

**Speech
Poster Session
Stanbro Room**
*Thursday, September 8, 1988
Morning (continued)*

Auditory Filter Simulations for Perceptual Processes of Bird Vocalizations

Okanoya, Kazuo and Dooling, Robert
University of Maryland

Temporal Information Processing: Word Recognition

Priebe, Carey
NOSC

Dynamics of Gestural Blending During Speech Production

Saltzman, E.; Goldstein, L.; Browman, C. and Rubin, P.
Haskins Laboratories

Temporal Knowledge: Recognition and Learning of Time-Based Patterns

Sung, Chen-Han
San Diego State University
Carey Priebe and David Marchette
Naval Ocean Systems Center

Natural Language Understanding, Propositional Representations and the Parrot System

Sutcliffe, Richard F.E.
University of Essex

Nettalk as a Simulation of Human Speech Development

Tom, M. Daniel; Schwartz, Richard G. and Tenoria, M. Fernando
Purdue University

**A Connectionist Model of Children's Comprehension and Production
of Simple English Sentences**

Wheatley, Barbara
University of Wisconsin-Milwaukee

**Lateral Inhibition and Relative Phase Shifts in the Spatio-Temporal Firing Patterns
of the Auditory Nerve: A Modelling Study**

Wu, Z.L.; Escudier, P. and Schwartz, J.L.
Institut de la Communication Parlee

An Error Tolerant Environment of Multilayer Perceptrons with Controlled Learning

Yu, Wellington C.P. and Teh, Hoon-Heng
University of Singapore

**Self-Organization
Poster Session
Park Plaza Castle
Thursday, September 8, 1988
Morning**

Self Organization as a Special Case of Time-Varying Adaptive Filters

Abutaleb, Ahmed
Temple University

Temporal Evolution of a Causal Network Through Conceptual Clustering

Ahuja, S.B. and Soh, W-Y
University of Maryland

Interacting and Communicating Connectionist Agents

Allen, Robert B.
Bell Communications Research
Riecken, Mark E.
BDM Corp.

A Neural Unsupervised Learning Technique

Atiya, Amir F.
California Institute of Technology

Variation and Selection: An Evolutionary Model of Learning in Neural Networks

Bergman, Aviv
SRI International

Printed Character Recognition by Self-Organizing Boolean Networks

Carnevali, P.
IBM European Center
Paternello, S.; De Castro, M.; Raspollini, C.; Vascotto, M. and Tonelli, T.
IBM Scientific Centers (European or Roma)

Neural Network Adaptation Using a Pleasure/Pain Paradigm

Cheung, J.Y.
University of Oklahoma

Transformational Theory of Feedforward Neural Networks

Cohen, D.A.; Mannion, C. and Shawe-Taylor, J.S.
Royal Holloway and Bedford New College

Self-Organization in Distributed Operating System

Fujita, Shohei
Stanford University

Exploratory Routines Can Direct Learning in Partially Known Non-Linear Systems

Guez, A. and Eilbert, J.L.
Drexel University

The SymMetric Adaptive Resonance Theoretic Model (SMART)

Kam, Moshe; Naim, Ari and Atteson, Kevin
Drexel University

Cluster Decomposition of Probability Density Functions

Luttrell, S.P.
Royal Signals and Radar Establishment

Adaptive Density Estimators

Marchette, David
Naval Ocean Systems Center

**Self-Organization
Poster Session
Park Plaza Castle
Thursday, September 8, 1988
Morning (continued)**

Activity Changes in Boolean Networks

Martland, D.
Brunel University

Spatially Traversed Autogenerative Nodal Model (ANM)

Monaco, Frank A.
Ansoldo S.P.A.

ART I and Pattern Clustering Algorithms

Moore, Barbara
MIT AI Lab

**A Network of Two Drive-Reinforcement Neurons That Learns A Solution
To A Realtime Dynamic Control Problem**

Morgan, James S.; Patterson, Elizabeth C. and Klopf, A. Harry
Wright-Patterson Air Force Base

A Classificatory Network Based on a Study of the Neocortex

Renfrew, CR
Strathclyde University
Malone, JR and Todd, A.
Glasgow University

Learning as Natural Selection in a Sensorimotor Being

Rinkus, Rod
Adelphi University

Unsupervised Learning in the N-Dimensional Coulomb Network

Scofield, Christopher L.
Nestor Incorporated

Pattern Driven Message Passing Architectures for Neural Networks

Simmes, S.
Science Applications International Corporation

Attention in a Neural Network Sornborger

Andrew, T.
Creative Intelligence & Company

A Bicameral Neural Network That Improves Convergence

Stinson, M.C. and Kak, S.C.
Louisiana State University

Learning with Recurrent Networks and Constant Synaptic Strengths

Stolorz, P. and Hoffman, G.W.
University of British Columbia

Nested Neural Circuits, Multi-Level Memory and Learning by Selection

Sutton, J.P. and Trainor, L.E.H.
University of Toronto

Implementing Competitive Learning Using Competitive Activation

Sutton, III G.G. ; Maisog, J.M. and Reggia, J.A.
University of Maryland

Associative Machines and Self-Organization

Voorhees, Burton
Athabasca University

**Pattern Recognition
Poster Session
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Thursday, September 8, 1988
Afternoon**

Network Learning Modifications for Multi-Modal Classification Problems

Atlas, L.E.; Marks, R.J. II and Taylor, J.W.

University of Washington

Hybrid Neural Networks

Austin, James

University of York (England)

A Network for Recognition and Classification of Continuous Patterns

Banzhaf, W. and Haken, H.

University of Stuttgart

Competing Network Models and Problem-Solving

Blackwood, D.; Elsberry, W. and Leven, S.

University of Texas at Arlington

A Parallel Associative Pattern Recognizer

Braham, Rafik

Georgia Institute of Technology

Pattern Recognition and Fault Tolerance in Non-Linear Neural Networks

Brause, R.

J.-W. Goethe University

Spectral Clustering with Neural Networks for Application to Multispectral

Remote Sensing of Minerals

Breitkopf, Peter and Walker, Robert

FMC Corporation

Self-Organization of Invariant Recognition Categories for Noisy Images

by an Adaptive Resonance Theory (ART) Architecture

Carpenter, Gail; Grossberg, Stephen and Meharian, Couroush

Boston University

String Algorithms and Neural Network Processing For Improved Pattern Recognition

Carroll, T.O.

State University of New York

Comparison of Internal Processing of Different Network Paradigms

Caudill, Maureen

Adaptics

Butler, Charles

BDM Corporation

Two-Dimensional Pattern Sequence Prediction Using High-Order Neural Networks

Collins, David H.

California Institute of Technology

Temporal Structure in Pulse-Superposed Neural Networks

Dayhoff, Judith E.

Judith Dayhoff & Associates, Inc.,

On Hopfield Neural Networks

Feild, Jr., William B.; Navlakha, Jainendra K.

Florida International University

**Pattern Recognition
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Stanbro Room
Thursday, September 8, 1988
Afternoon (continued)**

Certainty Worlds, Risk Judgments, and Neural Net Design

Hertz D.B.; Lee, E; Lynch, J.D.
University of Miami (Florida)

Composite Patterns

Horn, D.
Tel Aviv University

A Neural Network Model of Two-Point Discrimination

John, Kuruvilla
University of Illinois at Chicago
John, Thomas
BP America Research and Development

Structural Matching Using Neural Networks

Leung, C.H.
University of Hong Kong

Integration of Neural Network and Expert System for Pattern Recognition

Li, Dapeng and Wee, William G.
University of Cincinnati

Prognostics/Diagnostics of Mechanical Equipment by Neural Network

Liang, Enju; Rodriguez, Rodriguez J. and Hussein, Abdo A.
Technology International Incorporated

Design of Neural Networks to Classify Sonar Targets

Liou, Cheng-Yuan
National Taiwan University

Digital Neural Networks — A Distributed Architecture with Self-Evolving Capabilities

Masih, L. ; Stonham, T. J.
Brunel University, Uxbridge

Vector Quantization with Optimized Grouping and Parallel Distributed Processing

Matsuyama, Y.
Ibaraki University

A Backpropagation Network Error Correcting Decoder for Convolutional and Block Codes

Means, R.W. and Caid, B.
M/A-COM Government Systems

Pattern Oriented Expert Systems

Morales, G. and McIntyre, R.
University of Texas at El Paso

A New LMS-Based Algorithm for Rapid Adaptive Classification in Dynamic Environments: Theory and Preliminary Results.

Nguyen, Dziem and Lee, James S. J.
Boeing Electronic High Tech Center

The Functional Link Net: A Unifying Network Architecture Incorporating Higher Order Effects

Pao, Yoh-Han and Beer, Randall D.
Case Western Reserve University

**Pattern Recognition
Poster Session
Stanbro Room
Thursday, September 8, 1988
Afternoon (continued)**

Neural Networks for Sensor Fusion and Adaptive Classification

Perlovsky, Leonid I.
Nichols Research Corporation

Invariant Object Recognition with the Adaptive Resonance (ART) Network

Rak, S.J. and Kolodzy, P.J.
Massachusetts Institute of Technology

A Neural Network Approach for Implementing Expert Systems

Ramamoorthy, P.A. and Ho, S.
University of Cincinnati

Pattern Storage and Recall Performance in a Hebb Network Generalizing the Cerebral Cortex

Rhodes, Paul
West Palm Beach, FL

Optical Character Recognition Using Multiple Layer Outer Products for Orthogonal Feature Extractions and Classifications

Scheff, Kim
Clark University
Szu, Harold
Naval Research Laboratory

Multilayer Preceptron Training Using Optimal Estimation

Shepanski, J.F.
TRW, Inc.

A Neural Network System with an Automatic Generation Mechanism for Distorted Patterns

Shimohara K.; Tokunaga, Y; Uchiyama, T. and Kimura, Y.
NTT Human Interface Laboratories

An Algorithm for Pattern Recognition with VLSI Neural Networks

Sirletti, Bruno; Verleyson, M.; Vandemeulebroecke, A. and Jespers, P.
Universite Catholique de Louvain

Understanding in Problem Solving Viewed as Minimizing of Neural Network Architecture

Surkan, A.J.
University of Nebraska

Composite Algorithms for Shaping Attraction Basins

Venkatesh, Santosh S.
*University of Pennsylvania**
Pancha, Girish* and Psaltis, Demetri**
*California Institute of Technology***

Cellular Automata and Pattern Recall: An Example

Voorhees, Burton
Athabasca University

Distributed Associated Memories and Data Fusion

Wechsler, H. and Zimmerman, L.
University of Minnesota

The Capacity of k-Gridgraphs as Associative Memory

Werman, Michael
University of Minnesota

Analysis of Network Dynamics
Poster Session
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Thursday, September 8, 1988
Afternoon

Chaotic Relaxation in Concurrent Asynchronous Neural Networks

Barhen, Jacob
California Institute of Technology
Gulati, Sandeep and Iyengar, S. Sitharma
Louisiana State University

Relaxation Constants in Neural Nets: Theoretical Results

Barnard, E. and Casasent, D.
Carnegie Mellon University

Bounds on Capacity of Multi-Threshold Network

Bentov, I. and Huang, N.K.
University of Minnesota

A Data Flow Analysis of Connectionist Networks

Bookman, Lawrence and Zhang, X.
Brandeis University

Problem-Intrinsic Bounds on Sample Complexity

Breuel, Thomas L.
Artificial Intelligence Laboratory

Neural Network Models with Higher Order Neural Interactions

Busch, A.E. and Trainor, L.E.H.
University of Toronto

Cerebral Cortical Parallel Processing Using A Metric Tensor

Collins, III Thomas J.
KRUG International

Some Notes on the Probabilistic Semantics of Logistic Function Parameters in Neural Networks

Davies, Todd R.
SRI International

An Application-based Study of the Stochastic Parallel Computations in Harmony Theory

Fazal, Faiq Ali
AT&T Bell Laboratories

Periodic Behaviour of One and Two Dimensional Neural Networks

Goles, E.
University de Chile

Transitions Between Network States May Cause Both Equipotentiality and Localization of Function in Cerebral Cortex

Jacobson, J.Z.
Carleton University
Pullman, N.J.* and Treurnier, Wm.**
Queen's Univ. Communications Research Centre***

Adjusting to Variations in Tempo in Sequence Recognition

Kanerva, Pentti
NASA Ames Research Center

Analysis of Network Dynamics
Poster Session
Park Plaza Castle
Thursday, September 8, 1988
Afternoon (continued)

Non-Empty Box Counting Algorithm for Calculating Fractal Dimensions and Its Applications in EEG Analysis

Ling, F.H.

Shanghai Jiao Tong University

Xu, N. and Xu, J.H.

Academia Sinica, Shanghai

Stability of Neural Networks with Time Delay

Marcus, C.M. and Westervelt, R.M.

Harvard University

Analysis and Generalization of Back Propagation in Neural Networks

Musavi, M.T.; Rajavelu, A.; Sahai, S.; and Zhao, J.

University of Maine

Ultrametrics, Pseudo-Ultrametrics, Fuzzy Sets, and Pattern Recognition

Pearson, Ronald

E.I. DuPont de Nemours and Co., Inc.

A Survey of Network Power Spectra

Rohwer, R. and Renals, S.

Edinburgh University

Basins of Attraction and Spurious States in Neural Nets

Sitte, Joaquin

Queensland Institute of Technology

Open Loop Stability Criterion for Layered and Fully-Connected Neural Networks

Snyder, M.M. and Ferry, D.K.

Arizona State University

Remaking the Neural Net: A Perceptron Logic Unit

Van Alstyne, M.

MIT Lincoln Laboratory

Information Capacity of McCulloch-Pitts' Model

Xu, X.; Tsai, W.T. and Huang, N.K.

University of Minnesota

A Generalized Neural Network Model

Xu, X.; Tsai, W.T. and Huang, N.K.

University of Minnesota

Plenary Session and Buffet
Imperial Ballroom /Park Plaza Castle
Thursday, September 8, 1988
Evening

Plenary Session, Imperial Ballroom..... 5:10 PM to 7:10 PM

Real-Time Analog Computation in VLSI Neural Networks 5:10 PM
Carver Mead
California Institute of Technology

The Neurobiology of Neural Networks 6:10 PM
Terrence Sejnowski
Johns-Hopkins University

Exhibits and Buffet, Park Plaza Castle 7:00 PM to 10:00 PM

*(A buffet will be served and a cash bar will be available.
Exhibitor booths will be open throughout the buffet.)*

**Sensory-Motor Control
and Robotics Session
Imperial Ballroom
Friday, September 9, 1988
Morning**

Neurodynamics of Redundant Manipulators	8:00 AM
Barhen, Jacob <i>Jet Propulsion Laboratory</i>	
Model of the Cerebellum as an Array of Adjustable Pattern Generators.....	8:30 AM
Houk, James <i>Northwestern University</i>	
Sensorimotor Integration of Saccadic Eye Movements	9:00 AM
Optican, Lance <i>National Institute of Health</i>	
Neuromuscular Realization of Planned Arm Movement Trajectories	9:30 AM
Bullock, D. and Grossberg, S. <i>Boston University</i>	
Dynamic Patterns of Sensorimotor Behavior:	
Biological Control Structures and Constraints	10:00 AM
Kelso, J.A.S. and Schoner, G. <i>Florida Atlantic University</i>	
Adaptive Control of One-Legged Hopping Machine.....	10:30 AM
Collins, Joseph B. and Helferty, John J <i>Temple University</i>	
The Role of Proprioception in the Self-Optimization of the Neural Mediating the Redundant Vestibulo-Ocular Reflex.....	
Daunicht, W.J. and Werntges, H.W. <i>University of Dusseldorf</i>	
Topology-Conserving Maps for Motor Control.....	11:10 AM
Ritter, Helge and Schulten, Klaus <i>Technical University Munich</i>	
A Neural Model for Modifiable Pattern Generation in the Scratch Reflex.....	11:30 AM
Shadmehr, R. and Lindquist, G.D. <i>University of Southern California</i>	
The Role of Hidden Layers in Learning Motor Control In Autonomous Systems.....	11:50 AM
Pabon, Jahir and Gossard, David <i>Massachusetts Institute of Technology</i>	
Artificial Neural Networks for Modeling Discrete Dynamic Systems	12:10 PM
Levin, Esther <i>Technion</i> Gewirtzman, Raanan <i>IBM Israel Scientific Center</i>	
Lunch Break.....	12:30 PM to 2:00 PM

**Implementations: Optical and VLSI
Session
Georgian Room
Friday, September 9, 1988
Morning**

Fractal Sampling Grids For Holographic Optical Interconnections	8:00 AM
Psaltis, Demetri and Gu, Xiang-guang Caltech	
Optical Resonators, Learning, and Robots	8:30 AM
Anderson, Dana University of Colorado	
Learning and Heteroassociation in a Hybrid Optical System.....	9:00 AM
Soffer, Bernard Hughes Research Laboratory	
Optical Superconducting Neurocomputers.....	9:30 AM
Szu, Harold Naval Research Laboratory	
Title To Be Announced.....	10:00 AM
Sage, Jay MIT Lincoln Laboratory	
An Optoelectronic Connectionist Machine Utilizing Liquid Crystal Spatial Light Modulators.....	10:30 AM
Bigner, Jack; Zhang, Lin; Cotter, Lise K. and Johnson, Kristina University of Colorado at Boulder	
Optical Implementation of Neural Network Interconnects and Learning	10:50 AM
O'Callaghan, M.J. and Anderson, D.Z. University of Colorado	
Parallel Optical Processor Using Fiber Optics	11:10 AM
Scheff, K.M.; Alexander, B. and Stork, D.G. Clark University	
Dynamic Holographic Interconnections for Optical Neural Computers.....	11:30 AM
Brady, David and Psaltis, Demetri Caltech	
Application of Improved Deformable Mirror Array Technology to Neural Network Realization	11:50 AM
Collins, D.R.; Sampsell, J.B.; Florence, J.M.; Penz, P.A.; Hornbeck, L.J. and Gately, M.T. Texas Instruments, Inc.	
A Simple VLSI Architecture for Neurocomputing.....	12:10 PM
Pacheco, M.; Bavan, S; Lee, M. and Treleaven, P. University College, London	
Lunch Break.....	12:30 PM to 2:00 PM

**Sensory-Motor Control
and Robotics Session
Imperial Ballroom
Friday, September 9, 1988
Afternoon**

An Adaptive Neural Net Controller with Visual Inputs	2:00 PM
Tolat, Viral V. and Widrow, Bernard <i>Stanford University</i>	
Building and Using Mental Models in Sensory-Motor Behavior	2:20 PM
Mel, B.W. <i>University of Illinois at Urbana-Champaign</i>	
Neuronal Maps for Sensory-Motor Control in the Barn Owl	2:40 PM
Pearson, J.C.; Spence, C.D.; Gelfand, J.J.; Sullivan, W.E.; Peterson, R.M. <i>Princeton University</i>	
The Neural Control of Arm and Speech Movements: A Shared Architecture for Trajectory Generation	3:00 PM
Bullock, D. and Grossberg, S. <i>Boston University</i>	
Feedback Error Learning of Movement by Multi-Layer Neural Network	3:20 PM
Kawato, Mitsuo <i>Osaka University</i> Setoyama, T.* and Suzuki, R** <i>Osaka University*</i> , <i>Tokyo University**</i>	
A Parallel Distributed Architecture for Motor Control	3:40 PM
Morasso, P. <i>University of Genoa (Italy)</i> Zaccaria, R.* and Mussa Ivaldi, F.A. ** <i>University of Genoa*</i> <i>Massachusetts Institute of Technology**</i>	
Control of Mobile Robots with Neural Networks	4:00 PM
Nagata, S.; Kimoto, T. and Asakawa, K. <i>Fujitsu Laboratories Ltd.</i>	
Robotic Eye-Head-Neck Motions and Visual-Navigation Reflex Learning Using Adaptive Linear Neurons	4:20 PM
Waxman, A.M.; Wong, W-L.; Goldenberg, R.; Bayle, S. and Baloch, A. <i>Boston University</i>	

**Implementations: Optical and VLSI
Session
Georgian Room
Friday, September 9, 1988
Afternoon**

An Analog VLSI Implementation of the Marr-Poggio Stereo Correspondence Algorithm.....	2:00 PM
Mahowald, M. and Delbruck, T. <i>Caltech</i>	
CMOS Analog IC Implementing the Back Propagation Algorithm.....	2:20 PM
Furman, B.; White, J. and Abidi, A.A. <i>University of California, Los Angeles</i>	
Integrate-and-Fire Dynamics and Spiketrain Information Coding in Neuron Equivalent Circuits Employing Silicon Diodes.....	2:40 PM
Coon, D.D. <i>Microtonics Associates</i> Perera, A.G.U. <i>University of Pittsburgh</i>	
Analog "Neural" Network Integration.....	3:00 PM
Smith, M.J.S. and Portmann, C. L. <i>University of Hawaii</i>	
An Interconnect Structure for Wafer Scale Neurocomputers	3:20 PM
Rudnick, M. and Hammerstrom, D. <i>Oregon Graduate Center</i>	
A Modifiable Weight Circuit for Use in Adaptive Neuromorphic Networks.....	3:40 PM
Shoemaker, P.A. and Shimabukuro, R. <i>NOSC</i>	
EEPROMs as Analog Storage Devices for Neural Nets.....	4:00 PM
Hu, Victor; Kramer, Alan; and Ko, Prof. P.K. <i>U.C. Berkeley</i>	
A Large Hybrid Electro-Optic Computer for Neural Network Applications.....	4:20 PM
Kornfeld, C.D.; Frye, R.C.; Wong, C.C. and Rietman, E.A. <i>AT&T Bell Laboratories</i>	
Analog MOS Circuit Techniques in the VLSI Implementation of Neural Networks.....	4:40 PM
Satyanarayana, S.; Suyama, K. and Tsividis, Y. <i>Columbia University</i>	

**Vision
Poster Session
Stanbro Room
Friday, September 9, 1988
Morning**

- Optimization of Rotationally Invariant Object Recognition In A Neural Network**
Busenberg, Stavros and Rossi, Louis
Harvey Mudd College
- Depth from Stereo: Variational Theory and a Hybrid Analog-Digital Network**
Chhabra, Atul K. and Grogan, Timothy A.
University of Cincinnati
- Multichannel Approach to Adaptive Image Restoration Using The 2-D Least Squares Algorithm**
Chellali, Mohamed and Ingle, Vinay K.
Northeastern University
- Integration of Stereo-Vision and Optical Flow Using Markov Random Fields**
Clifford, Sandra P. and Nasrabadi, Nasser M.
Worcester Polytechnic Institute
- Image Compression Within Visual System Constraints**
Cottrell, G.W. and Willen, J.D.
Univ. of California, San Diego
- The Visual System in "Idle": Multiple Stable States**
Dev, Parvati
CEMAX, Inc.
- Network Implementation of a System for Autonomous Visual Flight Control Using Optical Flow**
Doner, J.; Rahman, Z.; Inigo, R; and McVey, E.
University of Virginia
- An Analytical Model of Lateral Inhibition in the Visual System**
Feld, D. and Parnas, B
University of California at Berkeley
- Morphology of Neural Networks in the Mammalian Visual System**
Gardner, Sheldon
Naval Research Laboratory
- Labeling Edges with a Linear Network: An Integration of Low-Level Vision Modules**
Geiger, David and Weinshall, Daphna
MIT
- Perceptual Grouping Network Architecture**
Gelband, Patrice and Lawton, Daryl T.
Advanced Decision Systems
- VLSI Architecture for Computer Vision Based On Neurobiological Principles of Organization**
Ginosar, Ran and Zeevi, Y.
Israel Institute of Technology
- Spatial and Temporal Masking by Saturation in the Human Fovea**
Girod, B.
MIT Media Laboratory

Vision
Poster Session
Stanbro Room
Friday, September 9, 1988
Morning (continued)

Automated Process Control Based on an Optical Fourier/Electronic Neurocomputer Inspection System

Glover, D. E.
Global Holonetics Corporation

Glass Pattern Recognition with Neural-Networks

Greenspan, H.; Fleisher, M.; Porat, M. and Zeevi, Y.Y.
Israel Institute of Technology

A Link Between Retinotopic Frame and Stable Feature Frame

Hartmann, G.
Universitat - GH-Paderborn

Development of Features for Texture Based Image Segmentation Using The Reduced Coulomb Energy Pattern Recognition Model

Heinemann, Karl G. and Menon, Murali M.
MIT Lincoln Laboratory

Networks for Learning Lightness Algorithms

Hurlbert, Anya C.
M.I.T.

Analysis of the Neocognitron's Outputs and Classification Performance Using Backpropagation

Johnson, Ken; Daniell, Cindy and Burman, Jerry
Hughes Aircraft Company

Hierarchical Feature Extraction and Representation in the Neocognitron

Johnson, Ken; Daniell, Cindy and Burman, Jerry
Hughes Aircraft

The Effects of a Probabilistic Environment on Perceptual Mechanisms

Kalish, M.
University of California, San Diego

Reflectance Estimation in the Presence of Sharp Shadows or Transparency

Kersten, Daniel and Plummer, Daniel J.
Brown University

Digital Halftoning of Images Using Feedforward Neural Networks

Kollias, S. and Anastassiou, D.
Columbia University

Adaptive Object Tracking Integrating Neural Network and Intelligent Processing

Lee, James S.J.; Nguyen, Dziem D. and Lin, C.
Boeing High Technology Center

A New Neural Network Model for Line Drawing Texture Segmentation

Li, Feng; Yao, Guozheng and Wang, Yunjui
Academia Sinica, Beijing PRC

Hierarchical Neural Network Architectures for Vision System

Lin, Jin-Kun
*North Carolina State University**
Mei, G-G.; Liu, W* and Chen, S-S.**
*University of North Carolina***

Vision
Poster Session
Stanbro Room
Friday, September 9, 1988
Morning (continued)

- Feedforward Shunting: The Role of 3rd Order Correlations in Neural Synchronicity**
Lopez, Luis R.
Teledyne Brown Engineering
- Object Recognition Using Contextual Information**
Mader, Steve
Honeywell Systems and Research Center
- The Face Pattern Identification by Back-Propagation Learning Procedure**
Midorikawa, H.
Seikei University
- Neural Network That Computes Visual Motion**
Miyamoto, K. and Yamada, H.
University of Tokyo
- Short Range Motion Detection in the Insect Visual System**
Ogmen, H. and Gagne, S.
Laval University
- Realization of Visual Perception Via Synaptic Reinforcement**
Omidvar, Omid M.
University of Science and Arts of Oklahoma
- A Channel Model Makes Better Predictions of Single Lateral Geniculate Neuronal Responses than a Three-Layer Network Model Does**
Optican, Lance M.; Richmond, B.J.; McClurkin, J.W. and Gawne, T.J.
NIN and NIMH, Bethesda Research
- Stochastic Relaxation and Correspondence Problems in Object Recognition**
Randall, A.F. and Caelli, T.M.
University of Alberta
- A Neural Network Classifier for Character Recognition**
Shirvaikar, M.V. and Musavi, M.T.
University of Maine
- An Architecture of an Image Processing System Optimized for Neural Network**
Takatori, Sunao; Kumagai, Ryohei and Yamamota, Makoto
EZEL, Inc.
- A Model of the Mapping of the Surface of the Arm on the Somatosensory Cortex.**
Todorovic, Dejan
Univerzitet u Beogradu
- A Lie Group Approach to the Design of Neural Networks for Perception of Shape Constancy and Common Fate Gestalt**
Tsao, Thomas and Kanal, Laveen N.
University of Maryland
- Opponent Mechanisms in Vision**
Walters, Deborah
State University of New York
- A Neural Network to Register Invariants in Object-Relative Position Under Observer Locomotion**
Whitehead, B.A. and Strong, G.W.
Drexel University

Vision
Poster Session
Stanbro Room
Friday, September 9, 1988
Morning (continued)

Contextual Image Segmentation with a Neural Network
Wright, W.A.

Sowerby Research Center

Neural Network for Model Based Recognition: Simulation Results
Zador, Tony; Gindi, Gene; Mjolsness, Eric; and Anandan, P.
Yale University

A Neural Network Approach to Computation of Optical Flow
Zhou, Y.T. and Chellappa, R.
University of Southern California

**Neurocomputers
Poster Session
Park Plaza Castle
Friday, September 9, 1988
Morning**

A Connectionist Architecture for Neural Networks

Ali, Kamal S.; Ali, Dia L. and Ali, Adel L.
University of Southern Mississippi

Perspectives on Neural Networks

Brakefield, James C.
KRUG International

Constrained Back-Propagation

Cailton, J.G.; Angeniol, B and Markade, E.
Thomson CSF Inc

Back Propagation Parameter Analysis on Multiprocessors

Cerf, G.; Mokry, R. and Weintraub, J.
Columbia University

Neural Net Hardware Performance Assessment

Cruz, C.A.
Plexus Systems

Simulation and Implementation Considerations with Classification Networks

Kolodzy, P.J. and Menon, M.M.
Massachusetts Institute of Technology Lincoln Lab

Investigation of Artificial Neural System Architectures Using Actors

Kraft, Timothy
Science Applications International Corporation

An Algebraic Projection Analysis for Back-Propagation Learning

Kung, S.Y. and Hwang, J.N.
Princeton University

Learning Implementation on a Deterministic General Purpose Neural Network

Lauria, Francesco E.
Universita' di Napoli

Analysis of Back Propagation Dynamics Using Graphical Network Representation Scheme

Lehar, S.
Textron Defense Systems

An Object-Oriented Language for Neural Network Simulation

Loe, K.F.; Hsu, L.S.; Chan, S.C. and Low, H.B.
National University of Singapore

ANSER: An Approach to Neural Network Design

Mader, Steve
Honeywell Systems and Research Center

On the Expedient Use of Neural Networks

Martinez, Tony
Brigham Young University

Molecular Electronics an Overview

Saia, Paul
Digital Equipment Corporation

A General Model of Neural and Related Networks

Seaholm, S.
Minnetonka, MN

**Neurocomputers
Poster Session
Park Plaza Castle
Friday, September 9, 1988
Morning (continued)**

**APL Implementation of a Neural Network with Dynamically Generated Middle
Layers of Arbitrary Number and Length**

Surkan, A.J. and Chen, Muh-Lin
University of Nebraska

Combined Backpropagation/Cauchy Machine

Wasserman, Philip D.
Anza Research

Aspirin for Migraines

Wieland, Alexis P.; Leighton, Russell and Morgart, William
The MITRE Corporation

Parallel Processing Neural Networks

Zargham, M.
Southern Illinois University at Carbondale

**Applications
Poster Session
Stanbro Room
Friday, September 9, 1988
Afternoon**

Criteria for Choosing Connectionist Paradigms for Real-Time Data Fusion and Adaptive Discrimination

Addison, Edwin R.; Cain, Michael and Dedmond, William
Booz, Allen & Hamilton Inc.

Connectionist Expert Systems for Process Planning

Ali, Dia L.; Ali, Adel L. and Ali, Kamal S.
University of Southern Mississippi

Image Reconstruction by Neural Net Processor

Bai, B. and Farhat, N.H.
University of Pennsylvania

Image Resolution Enhancement on a Neural Network

Bayley, J.S.
*University of Lowell**
Byrne, C.L.*; Fiddy, M.A.*; Abbiss, J.B.** and Brames, B.J.**
*Spectron Development Laboratories***

SDI Applications of Neural Network Technology

Castelaz, Patrick F. ; Zmuda, James E. and Mills, Dwight
Hughes Aircraft Company

Efficient Distribution of Backpropagation Models on Parallel Architectures

Ceci, L.; Lynn, P., and Gardner, P.
University of Colorado

On Neural-Logic Networks

Chan, S.C.; Hsu, L.S. and Teh, H. H.
National University of Singapore

Neural Networks for Image Databases

Cochet, Y. and Paget, G.
University of Rennes (France)

Artificial Neural Systems Engineering and Analysis

Deiss, Stephen
Science Applications International Corporation

Resource Allocation Using A Constraint Optimizing Adaptive Neural Network

Earle, George W.

GTE-SEDD

Szu, Harold

Naval Research Laboratory

A Billion Connection Per Second Feedforward Pipeline for Computer Vision Applications

Fogler, R.J.; Williams, R.L. and Hostetler, L.D.
Sandia National Laboratories

Binary Neurons with Analog Communication Links for Solving Large-Scale Optimization Problems

Foo, Yoon-Pin Simon
*University of South Carolina**
Takefugi, Yoshiyasu* and Szu, Harold**
*Naval Research Laboratory***

**Applications
Poster Session
Stanbro Room
Friday, September 9, 1988
Afternoon (continued)**

Neural Network Machine Vision

Fox, Richard; Czerniejewski, F; Fluet, F. and Mitchell, E.
Gould, Inc.

Using Small Multilayer Networks to Search Real Hyperspaces

Guha, Alope
Honeywell Corporate Systems Development Division

**Neural Network Identification and Extraction of Repetitive Superimposed Pulses
in Noisy 1-D Signals**

Hassoun, Mohamad and Spitzer, A.R.
Wayne State University

A Neural System Implemented in Fortran on a Parallel Digital Computer

Healy, Michael
Boeing Computer Services

**Automatic Chemical Process Control Using Reinforcement Learning in
Artificial Neural Networks**

Hoskins, J.C. and Himmelblau, D.M.
University of Texas at Austin

Analysis of Dataflow Diagrams by Neural Network

Hsu, L.S.; Chan, S.C. and Teh, H.H.
National University of Singapore

Neural Nets as Models of Global Socio-Political Behavior

Kaufman, Jonathan J.
Mount Sinai School of Medicine

A Neural Network Implementation of a Page-Swapping Algorithm

Lawson, D. and Williams, B.
Stetson University

Recognition of Hand-Written Symbols by Orientation-Selective Filtering

Lee, Kangsuk
Siemens Corporate Research and Support, Inc.

Simulated Annealing Applied to Shipbuilding Design

Lee, Won D.
ChungNam National University

Application of Back Propagation to Long Wave Infra-Red Signature Analysis

Lehar, S.
Textron Defense Systems

Dynamic Schemas, Expert Systems, and A.R.T.

Leven, Sam and Yoon, Young
University of Texas at Arlington

Adaptive 2-D Tracking With Neural Networks

McAulay, A.D.
Wright State University

Three-Valued Threshold Logic and Neural Networks: Application to Reliability Analysis

Parey, C. and Bonnemay, A.
IRDI

**Applications
Poster Session
Stanbro Room
Friday, September 9, 1988
Afternoon (continued)**

Neural Networks & Tactile Imaging

Pati, Y.C.; Krishnaprasad, P.S.; Peckerar, M.C. and Marrian, C.R.
US Navel Research Laboratory

Neuronal Path Planning and Motion Control of Mobile Robots

Pourboghrat, F. and Sayeh, M.R.
Southern Illinois University

Signal Modeling and Prediction Using Neural Networks

Ramamoorthy, P.A.; Govind, G. and Iyer, V.K.
University of Cincinnati

Control of a Deformable Mirror Using an Adaptive Network

Ransil, P. and Siegel, K.
Lockheed AI Center

Neural Network for Radar Terrain Image Recognition

Roberts, Iris P.
The Analytic Sciences Corporation

A Rule-Based Fault-Tolerant Neurocontroller

Rodriguez, Rodrigo J.; Liang, Enju and Husseiny, A.A.
Technology International, Inc.

A Neural Network for Acquisition of Object Images

Shah, B.H. and Graves, S.J.
University of Alabama

Neural Networks for Function Discrimination in EMG Controlled FES

Walking for Paraplegics

Uth, John and Graupe, Daniel
Univ. of Illinois at Chicago

Application of Neural Nets to Detection of Diabetes

Wadleigh, Frank R.
General Dynamics Corporation

An Application of a Multiple Neural Network System with Modifiable Network Topology (Gensep) to Online Character Recognition

Ward, David J.; Scofield, Christopher and Reilly, Douglas L.
Nestor Inc.

Possible Mechanism for the Symptoms of Gilles de La Tourette Syndrome:

Potential Application of Neural Network Principles

Williams, P.A.
LSU School of Medicine

Nondeterministic Adaptive Automata That Play Matching Pennies

Windecker, Richard C.
AT&T Bell Laboratories

Alternative Generalizers to Neural Nets

Wolpert, D.
University of California, Santa Barbara

**Applications
Poster Session
Stanbro Room**
*Friday, September 9, 1988
Afternoon (continued)*

Neural-Like Architectures Can Implement Complex Signal Processing Algorithms

Yeates, M.C.

Jet Propulsion Laboratory

Target Recognition Using Adaptive Resonance Neural Networks

Zmuda, James E.

Hughes Aircraft Company

Applications Session
Imperial Ballroom
Saturday, September 10, 1988
Morning

Title To Be Announced.....	8:00 AM
Buffa, Michael <i>Nestor, Inc.</i>	
Amacronic Sensors	8:30 AM
Veldkamp, Wilfrid <i>MIT Lincoln Laboratory</i>	
Application of Hierarchical Networks in Analog Pattern Categorization.....	9:00 AM
Ryan, Thomas W. <i>Science Applications International Corporation</i>	
Theory of the Backpropagation Neural Network	9:30 AM
Hecht-Nielsen, Robert <i>HNC, Inc.</i>	
Spacecraft Attitude Determination Using Neural Star Pattern Recognition.....	10:00 AM
Alvelda, P.; San Martin, M; Bell, C; and Barhen, J. <i>Jet Propulsion Laboratory, California Institute of Technology</i>	
Radar Signal Categorization Using a Neural Network.....	10:20 AM
Anderson, James A. <i>Brown University</i> Penz, P.A.; Gately, M.T. and Collins, Dean <i>Central Research Labs, Texas Instruments</i>	
ANNA: An Adaptive Neural Network Associator for Human/Computer Interfacing	10:40 AM
Jones, W.P. <i>Arthur D. Little, Inc.</i>	
Deconvolution Using a CMAC Neural Network	11:00 AM
Glanz, F.H. and Miller, W.T. <i>University of New Hampshire</i>	
An Approach to Restoration and Recovery Problems Using Parallel Hierarchical Neural Networks.....	11:20 AM
Kadar, I. <i>Grumman Corporation</i> Waner, S.; Wu, Y. and Hastings, H.M. <i>Hofstra University</i>	
Study of Real-Time Weld Seam Tracking Visual Image Analysis Using a Neural Network	11:40 AM
Rock, A.; Xu, X.; King, K.; Jones, J. and Vanderveldt, H. <i>American Welding Institute</i>	
An Electrical Hardware Neural Network of an Optimization-Problem Solver.....	12:00 PM
Yanai, H.; Hayakawa, Y. and Sawada, Y. <i>Tohoku University</i>	
The Mirrors/II Connectionist Simulator.....	12:20 PM
D'Autrechy, C.L. and Reggia, J.A. <i>University of Maryland</i>	
Lunch Break.....	12:40 PM to 2:00 PM

Vision Session
Georgian Room
Saturday, September 10, 1988
Morning

Neural Networks for Image Transformation, Analysis, and Compression.....	8:00 AM
Daugman, John G. Harvard University	
The Organization of Curve Detection: Course Tangent Fields and Fine Spline Coverings.....	8:30 AM
Zucker, Steven W. McGill University	
Some Principles of Neural Organization Inferred from Visual Psychophysics.....	9:00 AM
Sperling, George New York University	
Recent Results in Emergent Visual Segmentation.....	9:30 AM
Mingolla, Ennio Boston University	
Neural Mappings and Space-Variant Image Processing.....	10:00AM
Mallot, Hanspeter and von Seelen, Werner Joh. Gutenberg Universitat	
A Silicon Retina for Computing Local Edge Orientations	10:20 AM
Allen, Timothy P. and Mead, Carver A. Synaptics, Inc	
Neural Mapping and Parallel Optical Flow Computation for Autonomous Navigation	10:40 AM
Bulthoff, Heinrich H.*; Little, James J.* and Mallot, Hanspeter A.** MIT*, Johannes Gutenberg-Universitat**	
Vector Quantization of Images Based Upon the Kohonen Self-Organization Feature Maps.....	11:00 AM
Nasrabadi, Nasser M. and Feng, Yushu Worcester Polytechnic Institute	
Early Vision Applications of Feature-Map Diffusion-Enhancement Nets.....	11:20 AM
Seibert, M. and Waxman, A.M. Boston University	
"Collective Coding": A Mechanism to Improve the Signal/Noise Ratio of the Retinal Ganglion Cell	11:40 AM
Tsukamoto, Y.; Smith, R. and Sterling, P. University of Pennsylvania	
A Neural Network for Position Invariant Pattern Representation.....	12:00 PM
Lange, J. and von der Malsburg, C. University of Southern California	
Dimension Reduction Models for Topographical Maps in the Cortex	12:20 PM
Durbin, R. and Mitchison, G. Kings College	
Lunch Break.....	12:40 PM to 2:00 PM

Applications Session
Imperial Ballroom
Saturday, September 10, 1988
Afternoon

Prediction of Mortgage Loan Performance with a Multiple Neural Network Learning System	2:00 PM
Ghosh, Sushmito; Collins, Edward A. and Scofield, Christopher L. Nestor Incorporated	
Loan Underwriting by a Neural Network	2:20 PM
Smith, Murray Adaptive Decision Systems	
A Neural Net Application Environment	2:40 PM
Cruz, C.A. Plexus Systems	
Distributed Processing for Database Design	3:00 PM
Char, J.M.; Cherkassky, V. and Wechsler, H. University of Minnesota	
Application of Neural Networks to Sorting Problems	3:20 PM
Gray, D.L.; Michel, A.N. and Porod, W. University of Notre Dame	
Credit Evaluation with Missing Data Fields	3:40 PM
Madey, G. and Denton, J. Kent State University	
Desknet: The Dermatology Expert System With Knowledge-Based Network	4:00 PM
Yoon, Youngohc University of Texas at Arlington Peterson, Lynn L.* and Bergstresser, Paul R.** University of Texas at Arlington*, University of Texas SW Medical Center**	
Neural Net Solvers for Differential Games	4:20 PM
Bankes, Steve The RAND Corporation	
A Neural Net Approach to Discrete Fourier Transforms	4:40 PM
Culhane, A. D.; Peckerar, M.C. and Marrian, C.R.K. Naval Research Laboratory	

Neurocomputers Session
Georgian Room
Saturday, September 10, 1988
Afternoon

- The SAIC Neurocomputer Architecture.....2:00 PM**
Deiss, Stephen; Hicks, W.; Kasbo, R.; Morse, K.; Muenchau, E. and Works, G.
Science Applications International Corporation
- Parallel Neural Network Simulation Machine: NeuMan.....2:20 PM**
Kajihara, Nobuki; Matsushita, Satoshi; Nakata, Toshiyuki and Koike, Nobuhiko
NEC Corporation
- PFANNs: Pulse-Frequency Activated Neural Networks2:40 PM**
Cater, John P.
Digital Signal Corporation

Sensory-Motor Control and Robotics

Poster Session

Stanbro Room

Saturday, September 10, 1988

Morning

A Neural Network Approach for Robot Grasp Planning

Ali, Adel L.; Ali, Dia L. and Ali, Kamal S.

University of Southern Mississippi

Skin & Muscles: The Basic Wet-Ware for Sensory-Motor Control

De Rossi, D.

University of Pisa

Casalino, G.; Morasso, P.* and Mussa Ivaldi, F.A.**

University of Genoa Massachusetts Institute of Technology***

Decision Making Net for an Autonomous Roving Vehicle

Eberlein, Susan

Jet Propulsion Laboratory

Concept of A 4-Joint Machine with Neural Net Control for the Generation of 2-Dimensional Trajectories

Eckmiller, Rolf

University of Dusseldorf

The Design of an Adaptive Neural Controller for Collision-Free Movement of General Robot Manipulators

Graf, D.H. and LaLonde, W. R.

Carleton University

A Trainable Controller Based on Neural Network

Guez, Allon and Selinsky, John

Drexel University

Solution to the Inverse Kinematics Problem in Robotics by Neural Networks

Guez, Allon and Ahmad, Ziauddin

Drexel University

Neural Network Techniques Used to Create An Adaptive Spatial System for the Motor-Impaired

Hohensee, W.E.

University of Illinois

A Robot Control Strategy Using Neural Networks

Josin, G.; Charney, D. and White, D.

Neural Systems Incorporated

Gas Tungsten Arc Weld Modeling Using a Mapping Network

Karsai, G.; Ramaswamy, K. and Cook, G.E.

Vanderbilt University

Application of the Neural Network for the Trajectory Planning of a Biped Locomotive Robot

Kitamura, S.; Kurematsu Y. and Nakai, Y.

Kobe University

Real Time Learned Sensor Processing and Motor Control for a Robot with Vision

Miller, III, W. Thomas

University of New Hampshire

Sensory-Motor Control and Robotics

Poster Session

Stanbro Room

Saturday, September 10, 1988

Morning (continued)

Computer Simulation of the Motor-Neural System of a Simple Invertebrate

Niebur, E. and Erdos, P.

University of Lausanne

Learning Structure of the Cerebellar Cortex

Pacut, Andrzej

Oregon State University

Coordinated Trajectory Control in Intrinsic Sensorimotor Frames

Pellionisz, A.

NYU Medical Center

Maze Learning Using State-Space Search Performed by a Connectionist Network

Pinette, Brian

University of Massachusetts

Neural Network Learning Controller for Manipulators

Pourboghrat, F. and Sayeh, M.R.

Southern Illinois University

Neuromorphic Regulation of Dynamic Systems Using Back Propagation Networks

Sanner, Robert M. and Akin, David L.

MIT Space Systems Laboratory

A Self-Organizing Process for Sensory Data Fusion and Situation Analysis

Sung, Chen-Han

San Diego State University

Neural Networks for Robotic Control

Tawel, R. and Thakoor, A.P.

California Institute of Technology

Multiple Topographic Maps In Sensory Cortex and Joint Inversion

Travis, B.

Los Alamos National Laboratory

Neural Control of 3-Dimensional Truss Structure

Tsutsumi, Kazuyoshi

Kobe University

Effects of Forgetting on the Self-Optimization of Redundant Sensory-Motor Control Networks

Werntges, H.W. and Daunicht, W.J.

University of Duesseldorf

An Adaptive Network That Flees Pursuit

Winter, C.L.

Science Applications International Corporation

Game-Theoretic Interaction Among Stochastic Learning Networks for Adaptive Load Balancing

Yeung, D.Y. and Bekey, G.A.

University of Southern California

**Implementations: Optical and VLSI
Poster Session
Stanbro Room
Saturday, September 10, 1988
Afternoon**

**A New Generic Approach for Optoelectronic Hardware Realizations
of Neural Networks Models**

Agranat, Aharon; Neugebauer, Charles F. and Yariv, Amnon
California Institute of Technology

Training a Limited-Interconnect, Feedforward Neural Array

Akers, L.A. and Walker, M.R.
Arizona State University

Design of a Solid Optical Interconnect for Massive Neural Networks

Brown, J.B. and Caulfield, H.J.
Teledyne Brown Engineering

An Optical Neural Society of Mind

Caulfield, H. J.
University of Alabama in Huntsville

Neural Algorithms on VLSI Concurrent Architectures

Caviglia, D.D.; Bisio, G.M. and Parodi, G.
Universita' di Genova

Weight Discretization in Backward Error Propagation Neural Networks

Fiesler, E.; Choudry, A. and Caulfield, H. J.
University of Alabama in Huntsville

Progress on the Spin Chip Associative Processor

Goodwin, J.M.; Rosen, B.E. and Vidal, J.J.
University of California, Los Angeles

VLSI Implementation of Neural Networks Based on PN Sequences:

Gupta, P.K. and Kumaresan, R.
University of Rhode Island

Neural Networks, Optical Resonators, and Dynamic Holograms

Gustafson, Steven C. and Little, Gordon R.
University of Dayton Research Institute

Optical Implementation of a Shunting Subnetwork

Johnson, John L.
Redstone Arsenal

Random Code Neural Nets

Jourjine, Alexander N.
Analog Intelligence DA Corp.

**Architecture for Large Microelectronic Supervised Learning Artificial Neural Networks
Using a Hybrid Digital Analog Approach**

Kub, F.J.
*Naval Research Laboratory***
Ancona, M. G.**; Mack I.A.**; Moon, K.** and (Yao, C.T.)*
**Sachs-Freeman Associates*

Ring Systolic Designs for Artificial Neural Nets

Kung, S.Y. and Hwang, J.N.
Princeton University

**Implementations: Optical and VLSI
Poster Session
Stanbro Room
Saturday, September 10, 1988
Afternoon (continued)**

Inner-Product Optical Neural Processing and Supervised Learning

Liu, Hua-Kuang
*California Institute of Technology**
Chao, T-H.; Barhen, Jacob;* and Bittner, Graf**
*University of California, San Diego***

Fault Simulation of a Wafer-Scale Integrated Neural Network

May, N.
Tektronix
Hammerstrom, D.
Oregon Graduate Center

A Test Methodology for Electronic Neural-Network Associative Memory

Mazunder, P.
University of Michigan

An Analog Implementation of a "Neural" Optimization Network

Musavi, M.T.; Ramanathan, E. and Roy, A.
University of Maine

Implementation of Optical Sensory Neural Networks by Simple Discrete and Monolithic Circuits

Nabet, Bahram and Darling, Robert B.
University of Washington

A VLSI Architecture for Feedforward Networks with Integral Back-Propagation

Paulos, John and Hollis, Paul W.
North Carolina State University

A Fully Digital Architecture for Multi-State Neural Networks

Potu, B. and Ramamoorthy, P. A.
University of Cincinnati

A VLSI Three Layer Perceptron for Binary Image Classification

Rasure, John and Salas, John
University of New Mexico

Properties of Amorphous Silicon Photoconductive Synapses

Rietman, E.A.; Frye, R.C.; Wong, C.C. and Kornfeld, C.D.
AT&T Bell Laboratories

A Hypercube Compact Neural Network

Rostykus, P.L. and Somani, A.K.
University of Washington

Optical Optimization Processor Based on Binary Neurons and Analog Interconnects

Scheff, Kim
Clark University
Szu, Harold
Naval Research Laboratory

A Real-Time Interface Model for Neural Architectures

Signorini, Jacqueline
Universite Paris

Abstracts of Papers

**(organized by session, and
alphabetized by first author
within the session)**