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# Connections

The Newsletter of the IEEE Neural Networks Council

VOLUME 2

NUMBER 1

FEBRUARY 1992

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### CoNNections Newsletter

*CoNNections is published quarterly by the Institute of Electrical and Electronics Engineers for individual subscribers to the IEEE Transactions on Neural Networks.*

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## 1992 International Joint Conference on Neural Networks Beijing, China November 3-6, 1992

General Chair  
Dr. Zong Sha  
Chinese Institute of Electronics  
Beijing, China

Sponsored by:  
The IEEE Neural Networks Council  
The China Neural Networks Council  
The International Neural Network Society (INNS)  
The IEEE Beijing Section

The International Joint Conference on Neural Networks (IJCNN '92-Beijing) will be held November 3-6, 1992 (Tutorials on November 1-2), in Beijing, China. This conference is intended to provide a forum for dissemination of the latest scientific and technical information in the various fields of Neural Networks. All persons interested in the field of Neural Networks are invited to submit papers to this conference.

### General Information:

Complete program, registration and travel information will be mailed in January 1992. For further details you may write or fax:  
Dr. Russell C. Eberhart, Director  
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### TOPICS OF INTEREST

Papers may be submitted for consideration as oral or poster presentations in the following areas:

Applications	Associative Memory	Biological Models
Biomedical Applications	Bio-Molecular Electronics	Electrical Neurocomputers
Financial Applications	Fuzzy Logic	Image Processing
Mathematical Models & Methods	Hybrid Systems	Optical Neurocomputers
Optimization	Neurodynamics & Chaos	Self Organization
Vision & Hearing	Robotics & Control	Sensorimotor Control Systems

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### PAPERS MUST BE RECEIVED BY FEBRUARY 29, 1992.

All submissions will be acknowledged by mail, and accepted papers will be published as submitted.

All papers accepted for presentation will be published in full in the Conference Proceedings, which is expected to be available at the Conference for distribution to all regular Conference registrants. Oral presentations will be given from 8 a.m. to 12N and from 5p.m. to 9 p.m. Afternoons are devoted to poster sessions and exhibits.

Four (4) copies (one original and three copies) of the paper are required for submission. Do not fold or staple the original camera-ready copy. Only complete papers will be considered. Papers must be submitted camera-ready on 8 1/2" x 11" white paper with one inch margins on all four sides. They should be prepared by typewriter or letter-quality printer in one-column format, single-spaced, in Times or similar type style of 10 points or larger, and printed on one side of the page only. (This text is 10 point Times.) All text, figures, captions, and references must be clean, sharp, readable, and high contrast.

FAX submissions are *not* acceptable. There will be a charge for papers exceeding six pages.

Centered at the top of the first page should be the complete title, author name(s), affiliation(s), and mailing address(s). This is followed by a blank space and then the abstract, up to 15 lines, followed by the text. In the accompanying letter, the following information must be included:

- Full Title of the Paper
- Corresponding Author Name
- Mailing Address
- Telephone and FAX Numbers
- Technical Session 1st and 2nd choices
- Presentation Preferred- Oral or Poster
- Presenter Name, Mailing Address Telephone and FAX Numbers
- Audio Visual Requirements

## PRESIDENT'S LETTER



Russell C. Eberhart  
Research Triangle Institute

As I take over the Presidency of the IEEE Neural Networks Council, I reflect over the past two years under the leadership of Bob Marks. His guidance was creative, yet even-handed. He always considered all the sides of a question, but wasn't afraid to make hard decisions when they were needed. He paid attention to every administrative detail, but never lost sight of the big picture. And he insisted on the highest standards of integrity and service to the members. I hope I can do as well.

The IJCNN in Singapore was a resounding success by any measure. Over 600 participants heard excellent papers, and experienced the outstanding local hospitality of the IEEE Singapore Section. General Chairman Teck Seng Low and his colleagues have possibly hosted the first three-kilo conference in IEEE history...that is, the average weight gain during the conference exceeded three kilograms per attendee.

Our next IJCNN is in Baltimore this June under the capable leadership of Clifford Lau and his organizing committee. Having just moved to North Carolina after living near Baltimore for almost 20 years, I can vouch for the excellent culinary and sight-seeing opportunities in the Baltimore area. One warning: in Baltimore, eating steamed crabs isn't considered a meal; it's a social event!

Following the Singapore IJCNN, my wife Francie and I spent about two weeks in China, and several days in Japan. Prof. Sha Zong, General Chairman of the 1992 Beijing IJCNN, was our host in China. We traveled to Beijing, Guilin, Xi'an, Nanjing and Shanghai. I lectured on neural networks in several locations, and spoke at the Second Annual Chinese National Conference on Neural Networks at Southeast University in Nanjing.

Everywhere we went, the hospitality was warm and the food was delicious. IEEE membership is growing rapidly in China, with over 700 members now in the Beijing Section alone. Prof. Sha, with his organizing committee that includes Profs. Wu You Shou and Zhong Yi Xin, are doing a conscientious and efficient job in preparing for the first international neural networks conference to be held in China.

When I was a small boy growing up in Kansas, I dreamed of one day going to China and seeing the magnificent sights such as the Great Wall, the Forbidden City and the Ming Tombs. Now I've seen them. And now, thanks to the 1992 Beijing meeting, you can see them, too. Words cannot describe China. From the grandeur of the Great Wall to the beauty of the Li River near Guilin, it is simply not to be missed. So, even if you have to borrow money for the air fare, this is an opportunity worth taking advantage of. I hope to see many of you in Beijing.

Our host in Japan was Prof. Toshio Fukuda, who is the Chairman of the Steering Committee for the 1993 conference in Nagoya. Francie and I will never forget the dinner given by Toshie and his wife at their home, or spending the evening of December 7, 1991, singing old rock-n-roll songs with Toshie at a Karioke bar in Tokyo. Maybe world peace has a chance, after all.

### ..introducing Russ Eberhart

Russell C. Eberhart, the 1992 President of the IEEE Neural Networks Council is taking on two new challenges at once. He has also recently been named Director of Bio-Medical engineering at Research Triangle Institute, where he oversees staff who develop electronic, optical and mechanical biomedical, technology for diagnostic, monitoring and prosthetic applications.

Before coming to RTI, Russ was program manager for biomedical programs at the Johns Hopkins University Applied Physics Laboratory. Programs he supervised there included the expert network medical diagnostic program,

biomedical ingestible telemetry, EEG spike detection with neural networks, and the left ventricle pressure-volume project. At RTI, he will continue his diagnostic neural networks research. Addison Wesley has recently published his book, Neural Network PC Tools.

Before joining Johns Hopkins, he served as vice-president of Emcon Associates, president of Computer Junction, Ltd., and vice-president of Arctec Systems Inc. Dr. Eberhart earned his B.S. and Ph.D. in electrical engineering at Kansas State University.

## IEEE NNC Standards Committee Report

Walter J. Karplus, UCLA and Mary Lou Padgett, Auburn University

The Standards Committee was formed at the initiation of the IEEE Neural Networks Council to begin work on guidelines and standards. With Prof. Walter J. Karplus as chair and Mary Lou Padgett as vice-chair, a Standards Coordinating Committee was appointed and held its first meeting last July in Seattle. This was followed by an open meeting for attendees of IJCNN-91, also in Seattle. At that time, three provisional Working Groups were formed. These three groups will make preliminary reports at the first formal meeting of the Standards Committee at WNN92--the Third Workshop on Neural Networks: Academic / Industrial / NASA / Defense -- Technical Interchange and Tutorials, which will be held at the Auburn University Hotel and Conference Center, Auburn, Alabama, February 10-12, 1992.

The three provisional Working Groups are as follows:

**• Glossary and Symbols**  
Mary Lou Padgett (chair)  
Auburn University  
1165 Owens Rd., Auburn, AL 36830  
(205) 821-2472,  
mpadgett@eng.auburn.edu

**Purpose:** establish equivalencies and assist communication among the widely divergent neural networks community members.

The glossary committee met in conjunction with the SCS Neural Networks and Simulation Standards Committee in Orlando in October (at SimTec 91). About five hard-working volunteers scanned a collection of neural networks texts and tutorial material for ideas.

The presentations in the available texts were compared with the preliminary glossary supplied by Russell Eberhart last year. Some suggestions and comments were made. Walter Karplus' suggestions from the Seattle meeting were incorporated in the approach taken. The list of vocabulary terms and equivalencies provided by Eberhart was examined and found helpful. The team suggested that a diagram or diagrams showing the terms pointing to the network structures might be very helpful. Several of these diagrams were suggested. follow-on meeting of several days in duration will be needed at some point to actu-

ally hammer out a written report. This meeting may consist of interested persons working independently, then comparing suggestions at or before the next formal gathering. Enough publicity has been circulated to allow anyone wanting to contribute to provide written suggested input. The suggestions received before Feb. 1, 1991 will be incorporated in the WNN92 report, and modified following the discussions there.

### •Paradigms:

Prof. E. (Litsa) Tzanskou (chair)  
Dept. of Biomedical Engineering  
P.O. Box 909 Rutgers University  
Piscataway NJ 08855-0909  
(908) 932-2037

email: etzanako@elbereth.rutgers.edu  
**Purpose:** establish elementary building blocks for the construction and identification of neural network paradigms.

The paradigms committee is seeking funding to support a graduate student to code sample paradigms to provide some useful tools to the community. Any suggestions along this line would be welcome.

### • Performance Evaluation Methodology:

Robert Shelton (chair)  
PT4, NASA/JSC  
Houston TX 77058  
(713) 483-8110  
shelton@gothamcity.jsc.nasa.gov

**Purpose:** establish guidelines for comparative performance evaluation of neural networks.

The performance evaluation methodology committee has been active via email. About half dozen people have communicated their interest to Robert Shelton. The most enthusiastic supporters of this committee are people attempting to evaluate products before purchasing them. The defense community would like disinterested parties to help establish benchmarking guidelines to help with communication and fair evaluation. Several of these people will make technical presentations at WNN92 and will be available for conversation there.

We expect to formalize these working groups in February, 1992 and also to form an additional Work-

ing Group to deal with Hardware and Software Interfaces. Almost 250 people have indicated an interest in receiving written publications from the Standards Committee. Their enthusiasm and cautions are very welcome. The committee is working to help everyone understand a new and very broad-based technology and to firm up the foundation so the next steps in development can be made in an orderly manner. Guidelines that will foster new ideas and changes are sought.

Anyone interested in participating on the Standards Committee is encouraged to contact the above individuals or Professor Walter J. Karplus:

Prof. Walter J. Karplus  
Chair IEEE NNC Standards Committee  
Computer Science Department  
University of California  
Los Angeles CA 90024  
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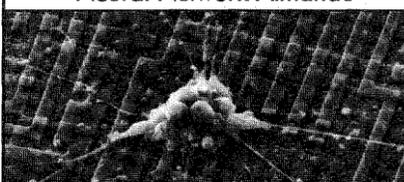


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## IJCNN 91 Singapore: The International Joint Conference on Neural Networks

Teck Seng Low, General Chairman

Singapore hosted the first IJCNN to be held outside the US from November 19-21, 1991. The conference was sponsored by the IEEE Singapore Section, the IEEE Neural Networks Council, and the INNS. It attracted 200 tutorial attendees and 600 conference attendees. A total of 457 papers were accepted for presentation at the conference. The breakdown of paper submission and attendees showed IJCNN 91 Singapore to be a truly international. It reflects the pace of Neural Network research around the world. IJCNN 91 Singapore also provided an opportunity for the 200 student attendees from all over the world to meet.

On the opening day seven tutorials were conducted. This was followed in the evening by a welcome reception and a public lecture by Prof. Terrence Sejnowski. This lecture, "Neural Computation", was organized for the Singapore public, including high school students, and conference attendees and the popularity of the lecture filled the 600 capacity hall to the brim. This lec-

ture was co-sponsored by the National Science and Technology Board of Singapore who also co-sponsored the seminar by Dr. Tom Caudell of Boeing Corp. at the National University of Singapore on the 22 November.

The conference from 19-21 November saw high attendance at the plenary addresses given by Prof. Kohonen, Prof. Nishikawa and Prof. Narendra. The invited talks by Pro-

fessors Eckmiller, Fukuda Lacher, Sejnowski and Drs. Eberhart, Bulsara, Kawato and Allinson were also well received.

The poster sessions proved popular and many were very well presented. This may be due to the US\$50 award for the best poster presentation at each of the six sessions.

In line with the increased applications of neural networks in industry and their possible impact in the finance and banking industry, and



IJCNN attendees learn local dances at the conference banquet. (Photo courtesy Bob Marks)

### Winners of IJCNN Singapore Poster Awards

Poster Session 1	Tactile robot shape recognition using geometrical angle/length	Ng E.W.K.; Coghill G.G., and Tuck D.L. University of Auckland, New Zealand
Poster Session 2	Neural Somatotopical Mapping for VLSI Placement Optimization	Zhang C.X.; Myllinski D.A., University of Karlsruhe, Germany
Poster Session 3	A Cognitively-Based Neural Network for Determining Paragraph Coherence	Carlson, Patricia A. and The, Anthony, Human Resources Directorate, USA
Poster Session 4	Applying Artificial Neural Networks to Object and Orientation Recognition for Robotic Handling and	Bowles, Angela, BHP Research, Melbourne Laboratories, Australia
Joint Winners	A Free Graph Method Using a Fuzzy Neural Network for Expressing Conditions of Complex Systems	Hashimaya, T.; Furuhashi, T. and Uchikawa, Y., Nagoya University Japan; Kato H., Nippondenso Co. Ltd. Japan
Poster Session 5	Rotation Invariant Neocognition	Ting, Hiau-Ann Christopher, National University of Singapore, Singapore
Poster Session 6	An Approach for Solving Dynamic TSPs Using Neural Networks	Shinozawa Kazuhiko; Uchiyama, Tadasu and Shimohara K., NTT Human Interface Labs., Japan

## Council Dominates Attention at IEEE News Briefing

Yearly, the IEEE holds a media briefing attended by the world's leaders in technical journalism. The IEEE Neural Networks Council (NNC) participated for the first time in this event in New York last year and, according to accounts in the IEEE Institute and Spectrum, was the dominant participant in the event.

The NNC's participation in the briefing was coordinated by current NNC President Russ Eberhart. Presentations were made by the Council in the areas of neural networks, fuzzy logic and virtual reality.

Dr. Eberhart (Research Triangle Institute) played a musical

composition crafted by a neural network he trained on songs such as 'O Susanna' and 'She'll be Comin' Around the Mountain'. The new song melody, dubbed 'A New American Folksong' by the *IEEE Institute*, was set to an accompaniment and was played at the briefing to an appreciating audience.

Dr. Jim Bezdek (University of West Florida) manually balanced a broomstick to demonstrate the difficulty in doing so. He then showed a video of a fuzzy broom stick balancer. The difference was that a mouse was running about in a cage attached to the top of the broomstick! The Japanese, with over 2000 patents, are cur-

rently dominating the market in fuzzy products and applications.

Dr. Tom Caudell (Boeing Computer Services, Boeing) gave a presentation on virtual reality. While sitting in their living room chairs, meeting participants of the future will be able to don a video mask and sensor gloves and participate in a computer generated meeting room with other participants around the world. Boeing is currently investigating use of virtual reality to design or modify an assembly.

(This is a compilation from *IEEE Institute*, *IEEE Spectrum* and oral accounts from the participants)



Shiro Usui, NNC AdCom member (left), Russ Eberhart, 1992 NNC President, and Roy S. Nutter, 1992 NNC Treasurer at the Presidents Dinner. (Photo courtesy Bob Marks)

provided for all attendees. This created ample opportunities for intellectual and social interaction, an aspect of IJCNN 91 Singapore which was very much appreciated by all who attended.

In conclusion, IJCNN 91 Singapore was a tremendous success. The visibility of IJCNN on the international stage has been firmly planted. The international atmosphere at IJCNN 91 Singapore and the enthusiasm and goodwill generated testifies to the transnationalism of technology and the benefits of international conferences.



Clifford Lau (left), Chair of the 1992 Baltimore IJCNN and Toshio Fukuda, Chair of the 1993 Nagoya IJCNN on a cruise in Singapore Harbour. (Photo courtesy Bob Marks)

industry panel chaired by Dr. Caudell from Boeing and a financial applications panel chaired by Dr. Deboeyck of the World Bank were organized.

A highlight of the conference was the Banquet on the evening of 20 November. Attendees were treated to a nine-course Chinese dinner and a cultural show which described Singapore's cultural diversity. It was a most enjoyable evening.

During the length of the conference, lunches and coffee were

## New IEEE Fellows

Congratulations to the following members of the Neural Networks community who have recently been named Fellows of the IEEE. The status of Fellow is awarded through an arduous evaluation process to members who have demonstrated outstanding contributions to the field. Only about 250 of the quarter million members of the IEEE are named as fellows each year. While many of the new fellows belong to several societies, the society listed completed the evaluation process.

• **Prof. James C. Bezdek**, Computer Science Department, University of West Florida, Pensacola, FL 32514

For contributions to the theory and applications of classifier design and clustering algorithms using pattern recognition techniques based on fuzzy models. *Systems Man and Cybernetics Society*

• **Dr. Steven A. Boggs**, Director, Research & Business Development, Underground Systems Inc., 63 Pears Avenue, Toronto Ont Canada M5R 1S9

For contributions to the understanding of the dielectric behavior of SF6 gas insulated substations. *Dielectrics and Electrical Insulation Society*

• **Prof. Ramalingam Chellappa**, Center for Automation Research, University of Maryland, College Park, MD 20742

For contributions to statistical model based approaches for two-dimensional spectral analysis and image processing. *Signal Processing Society*

• **Dr. Joe Hong Chow**, 8 Heritage Parkway, Scotia, NY 12302

For contribution to singular perturbation theory and its application to control and power systems. *Control Systems Society*

• **Mr. Richard P. Flam**, Flam and Russell, Inc., P. O. Box 999, Horsham, PA 19044

For contributions to the design and application of broadband antennas. *Antennas and Propagation Society*

• **Dr. Lawrence D. Jackel**, AT&T Bell Laboratories, Room 4D-433, Crawfords Corner Road, Holmdel, NJ 07733

For leadership in the applications of neural networks to pattern recognition and in the development of electronic systems implementing neural networks. *Neural Networks Council*

• **Professor Ramesh C. Jain**, Dept. of Elec. Eng. and Computer Science, The University of Michigan, Ann Arbor, MI 48109

For contributions to computer vision in the estimation of structure and motion from images *Computer Society*

• **Professor Abraham Kandel**, Dept. of Computer Science, and Engineering, Florida State University, 4202 East Fowler Avenue, Tallahassee, FL 32306

For contributions to fuzzy set theory and its dissemination, and to the application of uncertainty management

techniques to engineering systems. *Systems Man & Cybernetics*

• **Dr. Joseph W. Lechleiter**, Four Harding Terrace Fenwick Crest, Morristown, NJ 079613

For contributions to the theory and practice of high-speed digital subscriber lines. *Communications Society*

• **Professor Ren-Chyuan Luo**, Dept. of ECE, Box 7911 North Carolina State Univ., Raleigh, NC 27695-7911

For contributions to intelligent sensors and robotics. *Industrial Electronics Society*

• **Professor Rajnikant V. Patel**, Dept. of Electrical Engineering., Concordia University, 1455 De Maisonneuve Blvd., Montreal, Que., Canada H3G 1M8

For contributions to the numerical analysis and design of control systems. *Control Systems Society*

• **Dr. Herbert E. Rauch**, 401 Oracena Lane, Los Altos, CA 94022

For pioneering contributions to and leadership in the field of optimal estimation and control. *Control Systems Society*

• **Professor Edgar Sanchez-Sinencio**, 1812 Hondo Drive, College Station, TX 77843

For contributions to monolithic analog filter design. *Circuits and Systems Society*

• **Professor Kang G. Shin**, Dept. of EECS, The University of Michigan, Ann Arbor, MI 48109

For contributions to the theory of dynamic failure in real-time computing systems. *Computer Society*

## On the Move

Russ Eberhart, the 1992 NNC President, and Pat Simpson, the 1992 NNC Vice President Russ have both recently moved. Here's how to find them:

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xm8@sdcc12.ucsd.edu

**Wanted by the IEEE: Authors and Reviewers**

*Stamatios V. Kartalopoulos  
Chairman Publications Committee*

The IEEE Press, for many years, has published books contributing to the International Scientific Community with state of the art information.

Recently, the IEEE Press has taken a more active role in publishing in order to address not only the needs of the very advanced scientist but also the needs of the scientific community at large at different levels. Therefore, the IEEE Press considers not only reprint books, but also monographs, textbooks, and series books.

Moreover, the IEEE Press wants these books to meet the highest possible quality standards in both content and presentation of the book. With respect to quality of the presentation of a book, IEEE Press is fully equipped to meet this challenge, as already has been demonstrated. With respect to the quality of contents, IEEE's membership has the best of the best. A book is authored and reviewed by the most qualified scientists in the field. In addition, IEEE Press has established royalties which are in line with the publishing industry.

IEEE Societies consist of specialized groups of scientists, who are experts in their fields of interest. Thus Societies present a natural pool of potential authors and reviewers. Therefore, IEEE Press encourages a Society, or a Council such as our Neural Network Council, to sponsor a book to be published.

If any one of you is considering writing that book that was never written or published, it is never too late. Please, fill out the form and mail it today.

If anyone one of you would like to serve as a reviewer, your contribution will be appreciated and when the book is published, IEEE Press will send to you a complimentary copy.

Remember, a Society functions as a Society only if its membership participate actively. Please, fill out the form and mail it today.

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**CONFERENCE ANNOUNCEMENT AND CALL FOR PAPERS**

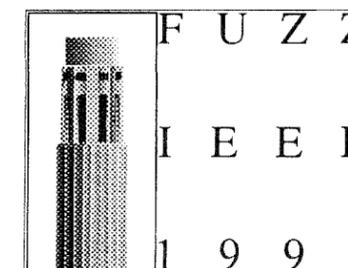
**SECOND INTERNATIONAL  
CONFERENCE ON FUZZY SYSTEMS  
SAN FRANCISCO, CALIFORNIA • MARCH 28 -APRIL 1, 1993**

**General Chair: Enrique H. Ruspini**

**Program Chair: Piero P. Bonissone**

**PAPERS FOR PRESENTATION ARE SOLICITED. TOPICS INCLUDE:**

- Basic Concepts and Tools
- Fuzzy Logic and its Foundations
- Neural Networks and Fuzzy Logic
- Relations between Fuzzy Logic and other Approximate Reasoning Methods
- Qualitative Modeling
- Applications to Intelligent Information Systems
- Case Based Reasoning
- Fuzzy Control
- Decision Support Systems
- Fuzzy Hardware
- Signal Processing and Image Understanding
- Pattern Recognition Applications
- Robotics and Automation Applications
- Applications to Intelligent Vehicles and Highway Systems
- Learning and Knowledge Acquisition
- Innovative Engineering Applications



**Deadline: August 3, 1992**

Deadline for receipt of papers is August 3, 1992.

Six copies of the paper must be submitted, eight pages maximum including figures.

Please include Title, authors name(s) and affiliation(s) on top of first page followed by an abstract.

FAX submissions are not acceptable.

Please send submissions prior to the deadline to:

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**Conference includes Tutorials, Exhibits, Plenary Sessions, and Social Activities**

## 1991 IEEE Workshop on Neural Networks for Signal Processing

Jenq-Neng Hwang and Candace Kamm

This workshop, the first organized by the recently-created Neural Network Technical Committee and sponsored by IEEE Signal Processing Society in cooperation with IEEE Neural Networks Council, was held at Nassau Inn, in Princeton, New Jersey, from September 30 to October 2, 1991. About 180 participants attended the workshop.

In his keynote address: "Workstation-Based Phonetic Typewriter." Dr. Teuvo Kohonen gave an insightful description of the experimental phonetic typewriter system being developed at Helsinki University of Technology. This system uses mel-scale cepstral coefficients for input features, LVQ for pattern classification, and a discrete-observation hidden Markov model (HMM) to produce phonemic transcriptions based on the VQ outputs.

In the first "Theory & Modeling" session, John Moody of Yale University proposed a new NN model selection criterion, named generalized prediction error, which generalizes previous criteria, such as generalized cross validation, final prediction error, Akaike's information criterion, and predicted squared error.

Shigeru Katagiri of ATR Laboratory discussed a new family of feed-forward networks that directly optimize the network's discriminative capability using the generalized probabilistic descent method.

The poster presentations on "Speech Processing", along with two lecture sessions on Tuesday and Wednesday, contained several advanced applications of neural networks to speech recognition. Most papers tried to improve the performance of current speech recognition systems either by using hybrid NN/HMM classifiers or variations of feed-forward NNs or time-delay NNs (TDNNs).

Two general purpose processor array architectures for NN simulations were the Princeton Engine SIMD array developed at David Sarnoff Research Laboratory and the

mesh-ring systolic NN architecture currently under development at the University of Southern California.

Sun-Yuan Kung of Princeton University also presented a tutorial lecture entitled "Digital Neurocomputing for Signal Processing". On Monday night, Lee Giles of NEC led a panel discussion on "How Competitive are Neural Network Techniques in Signal Processing Applications?" with Barbara Yoon of DARPA, John Moody of Yale, Y. C. Lee of University of Maryland Rama Chellappa of the University of Maryland, and Frank Fallside gave a historical review of NN research for speech recognition and its future directions.

John Makhoul of BBN Systems & Technologies, the second keynote speaker, reviewed several pattern recognition properties of NNs, from the classical linear dichotomy analysis for class partitioning to the most recent Kullback-Leibler criterion for NN estimates of posterior probability. He also discussed an interesting strategy for sampling training data for classification problems with a large number of classes. He tried to convey the message that "although experience with NNs will help in using them, a firm understanding of their properties is crucial for using them optimally."

Most papers presented in the "Theory & Modeling" poster session focused on applying linear and/or nonlinear NNs to several well-defined "linear" problems (either computationally intensive or with a time-varying nature) in signal and image processing. The papers presented in the "Image Processing & Pattern Recognition" session emphasized the critical need for the nonlinear filtering and non-parametric system identification capabilities provided by neural networks. Richard Lippmann of MIT Lincoln Laboratories gave an enlightening "critical overview of NN pattern classifiers." Dr. Lippmann started with a taxonomy of 5 types of conventional and NN pattern classifiers:

probabilistic (Gaussian & Gaussian mixtures), global (feed-forward NN, higher order polynomial net), local (RBF, kernel discriminant), nearest neighbor (K-NN, LVQ), and rule forming (binary decision tree, hypersphere). He concluded that all these methods, except for a few exceptions, produce comparable estimates to the Bayes probability on an artificially designed two-category classification problem and comparable recognition accuracy on five different classification tasks (two artificial problems, two speech recognition tasks, one handwritten digit recognition task). He made several interesting observations, e.g., RBFs required much less training time than the back-propagation classifiers at the expense of much more storage.

Other interesting new ideas for using NNs for signal processing applications were reported in the "Signal Processing" session on Wednesday afternoon. These new ideas included

- a weighted order statistics NN filter based on threshold decomposition architectures (i.e., a stack filter),
- a surface reconstruction NN for object orientation estimation based on nonlinear interpolation using root points,
- a data compression NN for progressive video transmission based on the ordered feature map,
- a simulated annealing competitive NN for data compression, and
- a feature extraction NN for reading sequenced DNA autoradiograms.

*The proceedings of the workshop were published as "Neural Networks for Signal Processing: Proceedings of the 1991 IEEE Workshop", IEEE Catalog Number 91-TH0385-5. A limited number of copies of the proceedings is available through IEEE Conference Services.*

*The 1992 workshop of NNSP is scheduled for August 31 - September 2, 1992, in Copenhagen, Denmark.*

## Calls for Papers

• **IEEE International Symposium on Intelligent Control** August 11-13, 1992. Glasgow, Scotland. U.K. *Sponsor:* IEEE Control Systems Society Theme: "Learning in Control" *Submissions:* Five copies of papers should be sent by February 15 to: Thomas C. Henderson, Department of Computer Science, 3190 Merrill Engineering Building, The University of Utah, Salt Lake City, Utah 84112 USA Phone: (801) 581-3601 Fax: (801) 581-5843, E-mail: tch@cs.utah.edu

• **2nd IEEE Workshop on Neural Networks for Signal Processing.** August 31 - September 2, 1992 Copenhagen, Denmark. *Sponsor:* The Computational Neural Network Center (CONNECT) and in cooperation with the IEEE Signal Processing Society. *Submissions:* 4 copies of extended summary by February 15 to Program Chair, John Aasted Sorensen, Electronics Institute Bldg. 349, Technical University of Denmark, DK-2800 Lyngby, Denmark. email: jaas@dtel.ei.dth.dk

• **Conference on Mathematical Aspects of Computer Vision** University of Colorado at Colorado Springs, Colorado Springs, Colorado May 21-23, 1992. *Submissions:* Send a one page abstract by March 1, 1992 to: Robert Carlson or Keith Phillips, Department of Mathematics, University of Colorado at Colorado Springs, Colorado Springs, Colorado 80933-7150 Carlson@vision.uccs.edu or Keith@pyramid.uccs.edu.

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• **ICCT 92: International Conference on Communication Technology** Sept. 16-18, 1992 Beijing, China TCCT'92. *Sponsor:* Chinese Institute of Electronics (CTE), China Institute of Communication (CC) and Tsinghua University. *Submissions:* Four copies of a 400 word summary in English of the paper. The author's name, return address, telephone and/ or fax number must be included. Send to: Prof. Chongxi Feng, Dept. of Electronic Engineering, Tsinghua University Beijing 100084, China FAX: (861) 2564176

• **ICAR92: The Second International Conference on Automation, Robotics and Computer Vision.** Singapore, 15-18 September 1992. *Sponsors:* Nanyang Technological University and the Institution of Engineers (Singapore), and in cooperation with the IEEE Computer Society, the IEEE SMC Society, IEEE Robotics and Automation Society (solicited), the IEEE Singapore Section, the Instrumentation and Control Society (ICS), Singapore Section and other local professional organizations.

*Submissions:* Four copies of an extended summary (300-500 words) of papers on NEURAL NETWORKS in engineering/scientific applications by **30 April 1992** to: Professor Yoshiyasu Takefuji, Dept. of Electrical Engineering, Case Western Reserve University, Cleveland, OH 44106. E-mail: takefuji@axon.eeap.cwru.edu

Authors of the other subjects are invited to submit four copies of an extended summary of 300-500 words to ICARCV'92 Conference Secretariat Associated Conventions and Exhibitions 204 Bukit Timah Road, #04-00 Boon Liew Building, Singapore 0922 Fax: (65) 31st IEEE Conference on Decision and Control, December 16-18, 1992, Westin LA Paloma Resort/Hotel, Tucson, AZ. *Deadline:* March 1, 1992. *Contact:* Professor T. Basar, Coordinated Science Lab, Univ. of Illinois, 1101 West Springfield Ave., Urbana, IL 61801, (217) 333-3607, (217) 244-1764 (FAX), email: tbasar@markov.csl.uiuc.edu.

• **30th Annual Allerton Conference on Communications Control and Computing.** September 30-October 2, 1992. University of Illinois, Champaign-Urbana. *Submissions:* Abstracts for short and long papers must be submitted by July 13, 1992. *Contact:* Paul Van Dooren and Mark Spong Allerton Conference, University of Illinois at Urbana-Champaign, Coordinated Science Laboratory, 1101 West Springfield Avenue, Urbana, Illinois 61801

• **Visualization in Biomedical Computing.** October 13-16, 1992, Chapel Hill NC. *Sponsor:* Dept. of Computer Science, Univ. of North Carolina, Chapel Hill. *Submissions:* 5 copies of an extended abstract and a 50 word statement of major results by **February 14, 1992** to: Dr. Ricard A. Robb, Technical Program Chairman, Visualization in Biomedical Computing '92, Mayo Foundation, Rochester MN 55905, Tel: 507-284-4937; Fax: 507-284-1632;

email: rar@bru.mayo.edu

• **ICIIPS'92 Beijing: International Conference on Intelligent Information Processing and Systems.** November 3-6, 1992. *Sponsors:* National Natural Science Foundation of China, IEEE Beijing Section, Chinese Institute of Electronics, Chinese Association of Automation. *Submissions:* 3 Copies of extended abstract by March 15 1992 to Mr. Shengfa Hu, Dept. of Automation, Tsinghua University,

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D. Fuzzy Development Tools: Hardware and Software: 1-5pm

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•**ESORICS 92: European Symposium on Research in Computer Security.** Toulouse France. November 23-5, 1992. **Submissions:** 5 copies of papers or panel proposals in French or English by **April 3, 1992** to: Jean-Jacques Quisquater, AFCET-Esorics-92, 156 boulevard Pereire, 75017, Paris FRANCE. email: deswarte@laas.fr

•**APPS'93: Applications of Neural Networks to Power Systems.** April 20-22 1993. Yokohama JAPAN. **Submissions:** 6 copies of 500-1000 word summary in English to Prof. Hiroyuki Mori, Dept. of Electrical Engineering, Meiji University, 1-1-1 Higashimita, Tama-ku, Kawasaki 214 JAPAN by **August 10, 1992**

•**31st IEEE Conference on Decision and Control, December 16-18, 1992, Westin LA Paloma Resort/Hotel, Tucson, AZ. Deadline: March 1, 1992. Contact:** Professor T. Basar, Coordinated Science Lab, Univ. of Illinois, 1101 West Springfield Ave., Urbana, IL 61801, (217) 333-3607, (217) 244-1764 (FAX), email: tbasar@markov.csl.uiuc.edu

•**IEEE International Workshop on Neuro-Fuzzy Control: Instrumentation and Control Applications.** March 22-3 1993, Muroran, JAPAN. **Submissions:** 3 copies of complete manuscript before August 31, 1992 to Dr. Toshio Fukuda, Dept. of Mechanical Engineering, Furo-cho, Chikusa-ku, Nagoya 464-01, JAPAN, tel: 81-52-781-5111, ext 4478; fax: 81-52-781-9243 or Dr. Yuzo Oshima, Electronics & Information System Div. Group, Nippon Steel, 31-1, Shinkawa, 2-chrome, Chuo-ku, Tokyo 104, Japan. Tel: 81-3-5566-2056; fax: 81-3-5566-2392.

•**IMACS Symposium on Signal Processing and Neural Networks SPANN'93:** 10-12, May 1993, MONTREAL Canada **Submissions:** Abstracts (3 pages 4 copies) **February 28 1992** to: Prof. Z. Jacyno, Department of Physics, University of Quebec at Montreal, P.O.Box 8888, Station A, Montreal, P. Quebec, Canada, HC 3P8

## Calendar:

•**February 10-12 WNN92: Workshop on Neural Networks.** Auburn University, Alabama. **Sponsors:** Auburn Univ. Space Power Inst. for Commercial Dev. of Space Power and Adv. Electronics, and NASA Headquarters in coop. w/ the Soc. for Computer Simulation, SPIE, INNS, INNSIGS, Electronics/VLSI and Expert networks and as a participating society, the IEEE Neural Networks Council. **Contact:** Mary Lou Padgett, 200 Broun Hall, Auburn Univ. AL 36849. Tel: (205)844-1855; FAX (205)844-1809; email: mpadgett@eng.auburn.edu

•**March 23-26 IEEE International Conference on Acoustics, Speech, and Signal Processing.** **Contact:** Sally Wood; EECS Dept., Santa Clara University, Santa Clara CA 95053. (408)554-4058. swood@scu.bitnet.

•**May 10-15, IEEE International Conference on Robotics and Automation.** Nice, France. Sponsor: IEEE Robotics and Automation Society. **Contact:** Harry Hayman, P.O. Box 3216, Silver Spring, MD 20918 USA, Tel: (301) 236-5621

•**May 18-22 ECCV2 European Conference on Computer Vision.** Santa Margherita Ligure Italy. **Contact:** Prof. Giulio Sandini, DIST Univ. of Genova, via Opera Pia 11 A, 16145 Genova, FAX 39 10 603 801,

e-mail eecv92@dist.unige.it.

•**May 20-22 IFAC Symposium on Intelligent Components and Instruments for Control Applications.** Malaga, Spain. **Contact:** SICICA '92, Facultad de Informatica, Plaza El Ejido s/n, 29013 Malaga SPAIN. (Tel:) (34)52-131412; FAX: (34)52-264270. E-mail: sicica@octima.u-ma.es.

•**May 19-21. 19th Annual International Symposium on Computer Architecture.** Queensland Australia. **Sponsors:** ACM/SIGARCH, IEEE Computer Society, IEEE. **Program Chair:** Allan Gottlieb, NYU Ultracomputer Laboratory, 715 Broadway, Tenth Floor, New York NY 10003 USA. email: gottlieb@nyu.edu.

•**June 6. COGANN: Workshop on Combinations of Genetic Algorithms and Neural Networks.** Baltimore. In conjunction with ICJNN-92. **Contact:** Dr. Darrell Whitley, Department of Computer Science, Colorado State University, Fort Collins, CO 180524 USA. whitley@cs.colostate.edu.

•**June 14-17, 1992, The Fifth IEEE Symposium on Computer-Based Medical Systems Sponsors:** Engineering in Medicine and Biology Society, The Computer Society, The Eastern North Carolina Section of the IEEE. **Contact:** Pete Santago, Department of Radiology, Medical Center Blvd. Winston-Salem, NC 27157-1022 phone:919-748-4260, fax:919-748-2870, email:cbms@m-rips.bgsu.wfu.edu

• **July 1-2, '92. Intelligent Vehicles '91.** Detroit. IEEE/IES Intelligent Vehicle Subcommittee. **Contact:** Ichiro Masaki, Computer Science Dept., General Motors Res. Labs., 30500 Warren MI 48090-9055.

USA. FAX 313 986 9356. Ph. 313 985 1466.

•**July 7-10 IROS'92: IEEE/RJS** Raleigh NC. **Sponsors:** IEEE IE and RA societies, Robotics Society of Japan and others. **Contact:** Ren C. Luo, ECE Dept., NCSU, Raleigh NC 27695-7911. Ph. 919-515-5193 ext 5199; fax 919-515-5523. email: luo@eceris.ece.ncsu.edu

•**August 4-7, 1992, International Conference on Control and Robotics.** Vancouver, Canada. Sponsor: International Association of Science and Technology for Development. **Contact:** Prof. C.C.H. Ma, Dept. of Electrical Engineering, University of British Columbia, Vancouver, B.C., Canada. V6T-1Z4, Tel: 604-822-2045; Fax 604-822-5949.

•**August 30-Sept. 3 IAPR: 11th International Conference on Pattern Recognition.** The Hague, Netherlands. Sponsor: International Asso-

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ICPR@ET.TUDELFT.NL.

•September 17-19. *IEEE International Conference on Systems Engineering* International Conference Center, Kobe, Japan. sponsored by the Pascal Research Institute, Kobe and organized under the General Chairmanship of Professor Kotaro Hirano, Electronics Engineering Department, Kobe University, Japan. Contact: Professor B.A. Sheno, Electrical Engineering Dept. Wright State University, Dayton, OH 45435.

•Sept.16-18, 1992 *ICCT 92: International Conference on Communication Technology* Beijing, China. Sponsor: Chinese Institute of Electronics (CTE) China Institute of Communication (CIC) and Tsinghua University. Contact: Prof. Chongxi Feng, Dept. of Electronic Engineering, Tsinghua University, Beijing 100084, China. FAX: (861)2564176.

•October 11-14 *MILCOM '92: Communications: Fusing, Command, Control and Intelligence*. San Diego CA. Sponsors: IEEE, IEEE Communications Society, and the Armed Forces Communication and Electronics Association. Contact: John Peckham, (619) 592-5153.

•March 28-April 1, 1993. *2nd International Conference on Fuzzy Systems*. San Francisco. See Announcement.

•*IJCNN'93 Portland*. Contact: George Lendaris Systems Science & Eng. Portland State University P.O. Box 751 Portland, OR 97207-0751 503 725 4988, 4960

lendaris@eecs.ee.pdx.edu

•*IJCNN'93-Nagoya Japan International Joint Conference on Neural Networks-Nagoya*. October 25-29, 1993. Organizers include Advisory Committee chair: Prof. Fumio Harashima. (Univ. of Tokyo), Organizing Committee chair Prof. Shun-ichi Amari (Univ. of Tokyo), Steering Committee chair: Prof. Toshio Fukuda (Nagoya Univ.), Program Committee co-chairs: Prof. Kunihiko Fukushima (Osaka Univ.). Details will be announced in the forthcoming formal Call for Papers.

#### FUZZIES

1. Police academy graduates are fuzzified.
2. Roulette wheels are fuzzy dice.
3. The relaxation command: 'fuzz out'.
4. Academician proponents are 'Profuzzers'.
5. Lotfi Zadeh is 'the Wizard of Fuzz'.

Courtesy(?) Bob Marks

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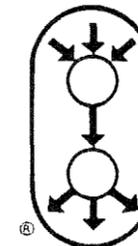
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