Newsletter of the IEEE Council on Neural Networks

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CoNNections Newsletter

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CALL FOR PAPERS

SECOND IEEE INTERNATIONAL CONFERENCE ON FUZZY SYSTEMS

SAN FRANCISCO, CALIFORNIA
MARCH 28 - APRIL 1, 1993

General Chair: Enrique H. Ruspini
Program Chair: Piero P. Bonissone

DEADLINE: SEPTEMBER 21,1992

Deadline for receipt of papers is September 21, 1992.

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

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

FAX submissions are not acceptable.

Please send submissions prior to the deadline to:

Dr. Piero Bonissone
General Electric CR&D
Bldg. K-1, Rm. 5C32A
1 River Road
Schenectady, New York 12301

FUZZ IEEE 1993

IEEE

Papers for publication are solicited on basic concepts of fuzzy systems, tools for their development, qualitative and approximate modeling, fuzzy control, fuzzy signal processing, fuzzy knowledge-based systems, and other applications of fuzzy-set theory and fuzzy logic to science and engineering.

This conference will be held in conjunction with the 1993 IEEE International Conference on Neural Networks.

For general information contact:
Meeting Management
5665 Oberlin Drive, Suite 110
San Diego, CA 92121

Tel. (619) 453-6222
FAX (619) 535-3880

IEEE NEURAL NETWORKS COUNCIL

TWO MAJOR CONFERENCES

1993 IEEE INTERNATIONAL CONFERENCE ON NEURAL NETWORKS

SAN FRANCISCO, CALIFORNIA
MARCH 28 - APRIL 1, 1993

General Chair: Enrique H. Ruspini
Program Cochairs: Hamid Berenji, Elie Sanchez, Shiro Usui

DEADLINE: SEPTEMBER 21,1992

Deadline for receipt of papers is September 21, 1992.

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

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

FAX submissions are not acceptable.

Please send submissions prior to the deadline to:

Dr. Hamid Berenji
AI Research Branch
MS 269-2
NASA Ames Research Center
Moffett Field, California 94035

ICNN 1993

IEEE

Papers for publication are solicited on basic concepts and applications of neurobiological systems, neural networks, and neural computers. Sessions on evolutionary programming, genetic algorithms, and virtual-reality applications are planned.

This conference will be held in conjunction with the Second IEEE International Conference on Fuzzy Systems.

For general information contact:
Meeting Management
5665 Oberlin Drive, Suite 110
San Diego, CA 92121

Tel. (619) 453-6222
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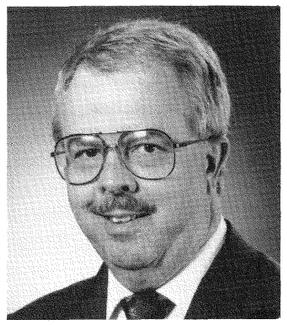
IEEE NEURAL NETWORKS COUNCIL

President's Message

TO BE OR NOT TO BE AN IEEE SOCIETY

Russell C. Eberhart
Research Triangle Institute
IEEE Neural Networks Council President



What follows is an attempt to articulate my observations and thoughts relative to whether the Neural Networks Council should become a Society of the IEEE. It is my belief that at least for now, we can better serve our members as a Council.

With the addition of the Power Engineering Society and the Computer Society, our Council now has 14 member societies. At least one additional society is expected to petition for membership in the next few months. This gives our council representation from approximately one-half of all 330,000 members of the IEEE.

This broad representation from across the IEEE puts us in the unique position of being able to be responsive to a wide range of interests. Having two-year appointments to our AdCom from each of the member societies assures us of a constant flow of new ideas and fresh talent.

If we became a Society, I believe that our focus would tend to gravitate towards only a few areas. We would tend to become an "old boy" (or "old girl") organization.

We would become just another society, in competition with all 35 or so of the other societies for membership and participation. We would no longer enjoy the significant inter-society support for our conference and publication activities.

As a Council, we can do anything a Society can do. We hold major conferences and small forums. We publish Transactions. We publish a newsletter. We are represented on IEEE boards and councils the same as we would be if we were a Society. And we don't have to worry about membership fees.

We can support our constituent societies in areas as diverse as neural networks, fuzzy systems, genetic algorithms and virtual environments. And we tend to get the "cream of the crop" as members of our AdCom and Standing and AdHoc Committees.

The technologies we represent cannot, I believe, be surgically removed from the Societies and merged into a unified, focused organization. I believe we better serve our constituents by emphasizing our diversity and responsiveness.

I also believe that the proliferation of societies in the IEEE needs serious reconsideration. Perhaps the days are past when all members' interests can be served by the pseudo-line organization of the societies. Maybe it's time for the IEEE to become more of a technically-integrated (matrix) organization.

When I read a draft version of the above material to the AdCom members in Baltimore in June, I did so with trepidation. I frankly didn't believe that many of them would agree with the position, but I wanted to put my ideas on the table anyway. To my surprise and delight, I received the support of each AdCom member who expressed an opinion. Representatives of our newest member societies actually said that they were relieved. I understand that some folks thought we were building a "war chest" in order to facilitate our transition to a Society.

The bottom line is that we want to maximize service to our constituents. (Notice that I didn't use the term "member", since Councils can't have members.) And I believe we can serve them better as a Council.

If you have an opinion on the Council versus Society issue (or anything else) please let your AdCom representative or any of the Council officers know.

IEEE-NNC Standards Committee Report

Walter J. Karplus and Mary Lou Padgett

At its June meeting the IEEE Standards Board formally approved the Project Authorization Requests (PAR's) submitted by the Working Group on Glossary and Symbols and by the Working Group on Performance Evaluation, so those two groups now have their "marching orders." The NNC Standards Committee had a series of fruitful meetings in conjunction with the Baltimore IJCNN. Over 400 people and companies are on the interest list for standards. If you would like to be included, please contact Mary Lou Padgett.

Working Group Reports:

•***Working Group on Glossary and Symbols.*** *Chair: Mary Lou Padgett, Auburn University*

The Working Group on Glossary and Symbols submitted the following PAR, which has been approved by the IEEE as a formal project for the group. A voting group will be constructed in the near future.

Project Title: Recommended Definition of Terms for Artificial Neural Networks

Scope: Terminology used to describe and discuss artificial neural networks including hardware, software and algorithms related to artificial neural networks.

Purpose: The subject of artificial neural networks is treated in a wide variety of textbooks, technical papers, manuals and other publications. At the present time, there is no widely accepted guide or standard for the use of technical terms relating to artificial neural networks. It is the purpose of this project to provide a comprehensive glossary of recommended terms to be used by the authors of future publications in this field.

Status Report:

Because the glossary being developed should be usable by everyone interested in neural networks, a simple basic structure is desirable. The draft glossary composed by Roy Dobbins of Software / Frontiers, Inc., Phoenix, Arizona and Russell Eberhart meets this requirement, with some modifications. To help insure that the finished product is usable and still specific enough to help in specialized areas, Glossary Special Interest Group Chairs have been appointed.

The exact scope of their groups will be discussed in San Francisco. Eventually, representation from all major neural networks thrusts and geographic areas should be included. People from academia, industry and government in all areas should be represented.

The first Glossary SIG Chairs are: Patrick A. Shoemaker, NOSC; Dale E. Nelson, WPAFB; and Emile Fiesler, IDIAP. The glossary will be structured in a modular form, with basic elements coming first, followed by more specialized subsets.

Your input is respectfully requested!

• ***Working Group On Performance Methodology*** *Chair: Robert Shelton, NASA/JSC*

The Working Group on Performance Methodology met at the Baltimore IJCNN to discuss their newly approved project and formulate an agenda.

Project Title: Guidelines for the Evaluation of the Speed and Accuracy of Implementations of Feed-Forward Artificial Neural Networks.

Scope

Artificial neural network implementations which implement supervised learning through minimization of an error function based on the sum of the squares of residual errors.

Purpose: Since 1986, a large number of implementations of the feed-forward back-error propagation neural network algorithms have been described with widely varying claims of speed and accuracy. At present, buyers and users of software and/or hardware for the purpose of executing such algorithms have no common set of bench-marks to facilitate the verification of vendor claims. The working group proposes to fulfill this need by assembling a suite of test cases.

Agenda:

Forward Propagation Only

The following will comprise a forward propagation system to which the standard will apply. Such a system will be a 3-layer (input, hidden, output), fully connected (sequentially i.e. input to hidden to output), feed-forward neural network.

Cases of varying sizes will be proposed. In addition, for each size, there will be at least one "problem" of the following two types: A.) Discrete output B.) Continuous output.

A "problem" will consist of a set of I/O pairs which the system will be required to reproduce. Sequential, portable (e.g. C language) computer code will be distributed which emulates the desired network including nominal weights and customary sigmoidal transfer functions. The user of the standard may make use of the distributed code and weight values as he or she sees fit. The determination of weights is deemed to be a "learning" problem and not within the scope of the part of the standard described here. Parity problems were proposed as hard cases for the discrete output test. Such problems are sufficiently well understood that weights could be provided without recourse to the use of learning algorithms. Character identification was suggested as a second easier kind of discrete output problem. The task of providing good test problems for the case of continuous output was agreed to be significantly more complex. It was suggested that mathematical combinations of algebraic and transcendental functions could serve as the basic model, but it was agreed that the determination of the candidate problems for continuous output would require considerable additional effort.

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• ***Working Group on Software and Hardware Interfaces*** *Chair: Steven Deiss, Applied Neurodynamics*

The NNC Working Group on Software and Hardware Interfaces met at the Baltimore IJCNN. The group was evenly divided by interest into an ad hoc Working Subgroup on Software Interface Standards and an ad hoc Working Subgroup on Hardware Interface Standards. The overall working group persists as an umbrella to integrate current efforts and promote new interface standards activities. Future meetings are expected to discuss PAR submission along with the technical issues.

The Software Group got off to a fast start in Baltimore and several meetings were held there. Ten ANN vendors and 15 labs and companies expressed interest in the task of formalizing selected data format standards which would be used to store ANN training sets. Many vendors have translation tools for importing data to their own environments, but many research users find it difficult to share data because of use of unique data formats and paradigm code written early on to accept their nonstandard formats. The group reached consensus that a simple standard training data format is needed, several were discussed, and it was felt that the task was manageable. For further information concerning this project contact:

Dr. Harold K. Brown
Florida Institute of Technology
Dept. of Electrical and Computer Engineering
Melbourne, FL 32901-6988
Phone: 407-768-8000 x 7556
Fax: 407-984-8461
Email: hkb@ee.fit.edu

The Hardware Group discussed related work on hardware standards that was carried out under the IEEE Computer Society Microprocessor Standards Committee and tried to focus on goals for the current group. In 1989 a Study Group was formed under the auspices of the MSC to evaluate Futurebus+ (896) and Scalable Coherent Interface (1596) for applicability to NN applications. The group recommended a hybrid approach while recognizing the longer range potential of a NN specific interface and interconnect standard. The present group chose to focus on 'guidelines' for utilization of existing standards for NN applications. It was the consensus that the NN community may not yet be ready for a real NN hardware interface standard since this is such an active area of research, however, work toward the evolution of such a standard would appear to be timely. For further information about this project or about other areas where interface standards might be appropriate contact:

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Thank you for your support of the IEEE-NNC Neural Networks Standards Committee. Please continue to interact with all of the working groups to help us grow in positive directions, and provide service to the entire community.

See You In San Francisco, if not before!

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FUTURE EVENTS

- ***IJCNN Beijing, Nov. 1-6, 1992*** A panel discussion and/or workshop will be conducted by Mary Lou Padgett early in the meeting. The formation of an international glossary and symbology for artificial neural networks will be discussed.
- ***SimTec/WNN92 Houston, Nov. 4-7, 1992*** There will be a Standards Committee Meeting on Friday, Nov. 6, in conjunction with this conference. Paper competition awards will be announced. Dr. Robert Shelton of NASA/JSC is conducting the Performance Measure Methodology Contest and Prof. E. Tzanakou of Rutgers is conducting the Paradigm Comparison Student Paper Contest.
- ***IEEE-ICNN and IEEE-FUZZ 1993 San Francisco, March 28 - April 1, 1993*** A come-and-go meeting of everyone interested in standards will be held on Sunday, March 27 and individual working group meetings will take place on Monday and Tuesday evenings, March 28 and 29.

•***Proposed New Activity:*** Working group to draft a glossary for fuzzy systems.

An initial meeting to that end will take place in San Francisco on March 27 and 28, in conjuction with the conference. Please contact either of the undersigned if you are interested in participating.

RIGs Notes

Rick Alan
TRW Safety Systems
Chairman, Regional Interest Groups Committee

•Free Speech in Arizona

The Phoenix, AZ Neural Networks Council RIG is interested in providing transportation, meals and lodging expenses for one or more CI speakers this year. Topics of interest are any of those within the CI field; specifically, neural networks, fuzzy logic, genetic algorithms, fractals, chaos, virtual reality and biomolecular computing. Both applied and theoretical presentations are welcome.

Past speakers include Lotfi Zadeh, Russ Eberhart, Enrique Ruspini, Pat Simpson and Stuart Hameroff.

If you might be interested in participating in our 1992-1993 schedule, please send a statement of your proposed topic(s) with SASE for reply to:

Rick Alan
IEEE Phoenix
NNC RIG
c/o TRW Safety Systems 4051
North Higley Road
Mesa, AZ 85205 USA
70324.1625@compuserve.com

Additionally, potential CI speakers who will be travelling in or "near" Arizona are invited to contact us at the above address to either attend or make a presentation at one of our meetings

•TANNS

The North Carolina Triangle Area Neural Networks Society has joined the IEEE NNC as a RIG. Contact Chris D'Costa (cjdcosta @eos.ncsu.edu) or Mo-Yuen Chow (chow@eos.ncsu.edu) for more information.

Congratulations and welcome.

•Help Wanted

The RIGs Newsletter is in need of writers. If you are interested in helping uncover some of the most exciting events and personalities in CI, please respond to Rick Alan. Annual prizes of $100, $50 and $25 for the best articles are being considered.

•Opportunity Knocks

If you would like to lead a RIG, please contact Rick Alan for a copy of the RIGs Guide (e-mail preferred). It, a couple of friends and a couple of hours will get you started.

IEEE-NNC welcomes IEEE Computer Society and IEEE Power Engineering Society

Robert J. Marks II

This year, the Neural Networks Council was joined by two of IEEE's largest societies: the IEEE Computer Society and the IEEE Power Engineering Society. In 1991, there were a total of 340,289 IEEE members. In terms of technical activities, there are thirty- seven technical societies and councils in IEEE. Ten of the societies formed the charter membership of the IEEE Neural Networks Committee in 1987. The Committee matured into the IEEE Neural Networks Council in 1990 and was joined by the Oceanic Engineering Society and Industry Applications Society.

The sum of memberships of society members of the NNC totals 232,633. Many IEEE members join two or more societies. Conservatively, though, over half of IEEE members form the constituency of the NNC.

Society Members of the IEEE NNC and Their 1991 memberships.	
•Circuits and Systems	16,612
•Communications	33,583
•Control Systems	11,734
•Computer	73,231
•Engineering in Medicine and Biology	8,348
•Industrial Applications	11,276
•Industrial Electronics	6,270
•Information Theory	6,608
•Lasers and Electro-Optics	7,009
•Oceanic Engineering	2,314
•Power Engineering	25,105
•Robotics and Automation	6,817
•Signal Processing	16,909
•Systems, Man & Cybernetics	6,817

TANNS: Triangle Neural Network Society

Mo-Yuen Chow
North Carolina State University

The Triangle Area Neural Network Society (TANNS) was established in January 1991 to provide a forum for the interchange of knowledge about neural networks and associated subjects. TANNS promotes communication, interest, and collaboration in the field of neural networks among local researchers, students, business, and the public in North Carolina. Currently, TANNS has about 280 members in and around the Research Triangle area (the region enclosed by the three cities of Raleigh, Durham, and Chapel Hill).

In March '92, TANNS co-sponsored the 4th North Carolina Symposium on Artificial Intelligence and Advanced Computing Technology, which included a two-day session on learning, including neural networks, and a half day tutorial on neurocomputing. About 170 attendees, many from outside the region, participated in the symposium.

TANNS sponsors a colloquium series given by local, national, and international speakers, which usually meets in Research Triangle Park once a month. The talks are open to the public.

Past speakers include: Geoffrey Hinton, Sara Solla, Mo-Yuen Chow, Dan Levine, Carey Floyd, Jeff Joines, Scott Labrozzi, Marshall Brain, Jonathan Marshall, Fred Atwater, Griff Bilbro, Larry Katz, Klaus Schulten, John Staddon, Paul Munro, and Ennio Mingolla.

We invite all interested parties to participate in and support TANNS. TANNS is supported by membership dues ($20 per year; students $10), corporate contributions, and affiliations with international neural network research organizations. For more information regarding TANNS activities, please contact:

Mo-Yuen Chow (NCSU, 919-515-7360, chow@eos.ncsu.edu) or Chris D'Costa (NCSU, 919-833-7837, cjdcosta@eos.ncsu.edu).

Conference Report

IEEE Gets Fuzzy

Tom J. Shwartz

*This review of **FUZZ-IEEE** originally appeared in **IEEE Expert**, June 1992.*
***Tom J. Schwartz** is a contributing editor to IEEE Expert and is founder of The Schwartz Associates, a consulting firm in Mountain View California.*

Fuzzy logic is in broad use in Japan -- including in car cruise controls, washing machines, elevator controllers, vacuum cleaners, subway engine controllers and security-investment systems but there has been considerable resistance to the technology in the US. However, a turning point in US acceptance was reached when the IEEE held its first International Conference on Fuzzy Systems, March 8-12. More than 500 attendees saw 164 presentations including 10 invited papers and 124 accepted papers out of 270 submitted). There were no poster sessions and only a small commercial exhibit area.

The first talk (and the first plenary talk) was presented by Lotfi Zadeh of the University of California at Berkeley, widely recognized as the father of fuzzy logic, having first proposed the subject in 1965. Zadeh stated that the conference would "go down in history as the turning point in fuzzy technology in the US."

Some resistance to fuzzy technology is due to some people's difficulty in differentiating between probability (*"There is a 50 percent chance of finding an apple in the refrigerator"*) and possibility (*"There is half an apple in the refrigerator."*) Probability tells you the likelihood that an event will happen. and fuzzy logic tries to linguistically quantify the degree to which an event has happened.

To clarify these differences. Zadeh and many others at the conference tried to reposition fuzzy logic as the "logic of interpolative reasoning." This interpolation is achieved by using class-of-membership functions, fuzzy inferencing, and a host of defuzzification methods. According to Zadeh, interpolation can reduce the solution of a large system to a series of equations (that can be arrived at linguistically). whose multiple concurrent solutions are interpolated and defuzzified to arrive at a single answer. In many instances, these techniques allow engineers to design systems that implement satisfactory, approximate answers to large system and control problems with much shorter design cycles than conventional methods.

Another theme at the conference was the use of both fuzzy logic and neural networks as systems estimators that do not require an initial model. Fuzzy logic creates a model via linguistic rules ("If the air flow is high and the temperature is falling slowly, then increase the gas flow a little"). Each predicate has a class-of-membership function, and the conclusion is realized by combining the predicates according to the rules of fuzzy logic inferencing. In a complete control system, many rules will fire, and conflicting conclusions will be combined (interpolated) using inference rules. The resulting conclusion will be a function, which is usually defuzzified to yield a crisp value. Neural nets, on the other hand, learn to create a model-free estimator using numeric information based on previous system performance or cases.

About 20 percent of the papers referred to neural nets. Some researchers use them to create or tune the class-of-membership functions, in which case fuzzy rules are imbedded in a back-propagation neural net. The neural net tunes the class-of-membership function and weights rules based on the connection strength between processing elements. Another approach is to use some form of competitive learning to derive the rules once the class-of-membership functions are given. Neural nets can also create both the rules and the class-of-membership functions. The most notable papers on the subjects were "Fuzzy Systems as Universal Approximators" by Bart Kosko of the University of Southern California, "Real-Time Supervised Structure/Parameter Learning for Neural Networks" by C.T. Lin and C.S.G. Lee of Purdue University. and "A Neural Expert System Using Fuzzy Teaching Input" by Yoichi Hayahi of Ibaraki University, Japan.

(Recognizing the closeness of the two fields. the IEEE Neural Networks Council decided that the next International Conference on Fuzzy Systems would actually be two concurrent conferences: one on neural nets, and the other on fuzzy systems. The combined conference is planned for March 28 to April 1, 1993 in San Francisco.)

Fuzzy systems have found a real home in control applications: More than 25 percent of the papers were on the subject, with system stability receiving particular attention. Fuzzy control systems are frequently criticized because of their inability to prove closed-loop system stability, which forces designers to perform massive numbers of system simulations and system regression testing. But some researchers at the conference showed that fuzzy system stability can be proved mathematically in some limited situations. The most interesting stability papers were "Phase Plane Analysis Tools for a class of Fuzzy Control Systems" by C.J. Harris and C.G. Moore of Southampton University in England, "Sliding Mode Fuzzy Control" by R. Palm of Siemens, and "Stability Analysis of Discrete Fuzzy Control Systems" by S. Singh of the Kyushu Institute of Technology, Japan.

Four presentations on control applications stood out. First was the plenary talk on "Fuzzy Control: Principals, Practices. and Perspectives" by M. Sugeno of the Tokyo Institute of Technology, who showed a video of a four-propeller helicopter controlled by a fuzzy system.

The second notable control paper was "Tether Operations Using Fuzzy-Logic- Based Length Control" by R.N. Lea and J. Villarreal of NASA Johnson Space Center, Y. Jani of Togai Infralogic, and C. Copland of Loral Space Information Systems. Their system uses 48 fuzzy rules to control a tethered object under a variety of conditions, such as a satellite tethered to a space shuttle. NASA could generate a controlled gravity in the tethered object, which could then be used for experiments on calcium loss in humans as a function of gravity. NASA could also lower a model airplane from the shuttle into the upper atmosphere to investigate flight surfaces. The work

was completed too late for the upcoming Italian tethered-satellite shuttle mission, but it is hoped the system will be flight- ready before 1995.

The third notable control paper was Fuzzy-Logic Control of AC Induction Motors" by J. Cleland and W. Turner of Research Triangle Institute, P. Wang and T. Epy of Duke University, P.J. Chappell and R.J. Spielgel of the US Environmental Protection Agency, and P. Bose of the University of Tennessee. This application seeks to maximize the efficiency of AC induction motors by controlling torque. It turns out that the efficiency of such motors drops dramatically for loads below 50 percent of rated torque. Using a fuzzy controller on 25- to lOO-horsepower motors, the researchers realized annualized energy savings between 1.4 and 3 percent over conventional voltage-frequency controllers. In the US, 50 percent of the energy savings from this approach would come from retrofitting only 0.4 percent of the applicable motors. As Cleland said. "The ultimate goal of adjustable-speed-motor drives is to put DC motors out of business. We think that fuzzy logic will help finish that off."

The fourth notable control paper and the conference's most consumer-oriented paper was "An Electronic Video Camera Image Stabilizer Operated on Fuzzy Logic" by Y. Ecua, H. Akahori, A. Morimura, and N. Wakami of Matsushita Electric Industrial Company. Used to steady images in hand-held Panasonic camcorders, the controller uses only eight rules applied over four equal regions of the image. The rule are of the form "If the points in the image are moving a little in the same direction, then stabilize the image. If the points are moving in different directions, then don't stabilize the image." After the rules are formulated, the class-of-membership function is tuned using the simplex method. The system operates on 60 frames a second in real time.

Some of these applications need the fuzzy-logic functions incorporated on semiconductor chips; in fact about 10 percent of the papers were on this subject. The most novel of these papers was "Current-Mode Analog Fuzzy Hardware with Voltage Input Interface and Normalization Locked Loop" by M. Sasaka, N. Ishikawa, F. Ueno, and T. Inoue of Kumamoto University. The advantages of their approach over digital methods include speed, power consumption, and direct sensor input.

Other topics at the conference included fuzzy logic in image processing, understanding, synthesis and character recognition, the extension of fuzzy logic theory and inferencing methods, fuzzy information processing (including fuzzy database search and clustering techniques. decision analysis, fuzzy simulation techniques. and predictive forecasting.)

Although the commercial exhibit area was small, there was a lot of activity. Aptronix introduced its new Windows-based development environment. Fide, which will also be the front end for a new line of fuzzy controller chips that Motorola was expected to announce by July.

Hyperlogic introduced an AT-based I/0 board for its Windows-based fuzzy tool, Cubicale.

Inform, a long-time German player, disclosed it will open an office in Evanston, Illinois, and make its Fuzzytech development tool available in English. Fuzzytech is the front end for a family of Inform controllers that use Siemens semiconductor chips.

Togai Infralogic revealed that it will share technology with Siemens, and that it has second-generation fuzzy ASIC capability that greatly improve on the functionality and speed of its previous fuzzy ASICs. The company also announced functional extensions to its flagship fuzzy-development product, TIL Shell.

The TIL Shell+ will initially be available under Windows, and the company expects to port it to Sun workstations. Togai also demonstrated TIL Gen, a system for generating fuzzy rules from a trained neural net once the class-of-membership functions are defined using various forms of competitive learning.

The real surprise of the show was Omron's commitment to fuzzy logic. This $3.3-billion Japanese controller firm started shipping fuzzy controllers in 1988 and already has about 350 sales and support people in the US. The company expects to achieve about $4.5 billion in total sales by 1995, with $500 million from fuzzy-based controllers and $500 million of its total sales from the US. Omron has already been granted more than 100 patents in fuzzy control and has applied for 777 more. The company recently reached an agreement to license its technology to NEC for that firm's 4- and 8-bit controllers.

Omron has been very cautious in introducing its products in the US. For instance, the company already has a product in Japan called Sgule (a Japanese synonym for "superior") that runs on a PC and generates both class-of-membership functions and fuzzy rules from cases. The product can be used for a variety of diagnostic and financial applications, such as credit scoring and machine repair. and Omron claims it cuts system development time by 66 percent compared with hand-generated fuzzy systems.

Overall, the conference may indeed have been a turning point in the US adoption of fuzzy logic, but such conferences will have to attract many more papers on deployed applications to increase the technology's credibility in the minds of American engineers.

Conference Report

IJCNN92/Baltimore:
The best conference on neural networks ever

Clifford Lau
Office of Naval Research
General Chair

The 1992 International Joint Conference on Neural Networks (IJCNN) was held at the Baltimore Convention Center on June 7 - 11, 1992. This conference was one of the series of very successful IJCNNs that were co-sponsored by the IEEE Neural Network Council (NNC) and the International Neural Network Society (INNS).

The planning for the conference started two years ago when the IEEE NNC asked me to be the general chair. I was only delighted for such an opportunity, since IJCNN represented the best of all the conferences on neural networks. I was also presented a challenge to do better than past IJCNNs because of the uncertainty in the economy at the time. Throughout the planning process, I have had the most enthusiastic support from the NNC (Dr. Russell Eberhart, President; Dr. Robert Marks, Past President) and from the INNS (Dr. Paul Werbos, President; Dr. Bernard Widrow, Past President). I would like to thank the IEEE NNC and the INNS for giving me the autonomy to organize the conference the way I saw fit. As it turned out, in spite of the recession, the 1992 IJCNN was the best conference on neural networks ever. Preliminary data indicated that more than 1,400 people participated in the conference, from 31 countries.

The conference consisted of a day of tutorials on June 7, when 158 peoples registered for ten different tutorials. The best attended tutorial was the one given by Michael Jordan on New Learning Algorithms. During the four day conference, each day was started by a plenary talk and was followed by four parallel technical sessions. A total of 598 papers, including both oral and poster papers, were presented. This was the first time that many excellent papers were presented at IJCNN!

Another first for IJCNN was the fact that for the first time in history the conference proceedings were put in the form of a CD ROM. The entire four volumes of the IJCNN'92 Proceedings were put in one CD ROM. This made it much easier to carry around. The CD ROM project was sponsored by the IEEE NNC in collaboration with the IEEE Circuits and Systems Society and the IEEE Engineering in Medicine and Biology Society. Much thanks belonged to Mani Soma of the University of Washington and Stamatios Kartalopoulos of AT&T Bell Laboratories for spearheading the CD ROM effort.

The conference was kicked off on Monday, June 8, by a plenary talk by Professor Stephen Grossberg of Boston University on *Supervised and Unsupervised Learning*. Grossberg, of course, was no stranger to the neural network community and was well known for his work on Adaptive Resonance Theory. The plenary talk on Tuesday was given by Professor Leon Cooper of Brown University on *Synaptic Plasticity in the Visual Cortex: Toward a Molecular Basis for Learning and Memory Storage*. Cooper, in addition to his Nobel Prize on the theoretical understanding of low temperature superconductors, was also well known for his work on the mean field theory for vision processing. On Wednesday morning, the plenary talk was given by Professor Gary Lynch of the University of California at Irvine on the Synaptic Learning Rules: the Causes and Computational Consequences of LTP. Lynch was well known for his work on Long Term Potentiation as a mechanism for synaptic modification. The plenary talk on Thursday was given by Dr. Jerome Feldman of the International Computer Science Institute on *Natural Computation and Artificial Intelligence*. Feldman was one of the first computer scientists to embrace the connectionist approach to artificial intelligence.

The highlight of the conference was the keynote address on Tuesday night given by Dr. Eugene Wong (Associate Director for Industrial Technology, Executive Office of the President, Office of Science Technology Policy) on High Performance Computing. Dr. Wong was the former Chairman of the Department of Electrical Engineering and Computer Science at the University of California at Berkeley and knew a great deal about neural networks. His talk represented the strong support for high performance computing including neural computing in the Bush Administration.

In addition to and in parallel with the technical sessions, special sessions with invited speakers were also outstanding features of the conference. The talk by Robert Lucky of AT&T Bell Laboratories drew such a crowd that it was standing room only. All the special sessions were well attended. Special thanks should go to the Special Sessions Chair, Dr. Andy Penz of Texas Instruments for organizing such outstanding sessions. In conjunction with the conference, a total of 30 exhibitors displayed their neural network hardware, software, and books at the conference. Credit for the excellent exhibit show belonged to the Exhibits Chair, Dr. Herbert Wang of Rockwell Science Center. The student volunteers were a big part of the conference, and were a major reason the conference ran so smoothly. Many thanks are due to the Volunteers Chair, Nina Kowalski of the

University of Maryland for an outstanding job of organizing the student volunteers. For a conference to be successful, nothing is more important than the finances. The Finance Chair, Dr. Pat Shoemaker of NCCOSC San Diego, did an outstanding job of paying the bills and keeping an account of the balance. Last but not least, Nomi Feldman of Meeting Managements and her staff did a superb job of processing the papers, printing the Proceedings, and overall management of the conference. They were hard working, conscientious, efficient, competent, and a joy to work with.

The single person who should take the most credit for the great success of the conference was the Program Chair, Professor John Shynk of the University of California at Santa Barbara. He single handedly organized the Program Committee and the outstanding technical program. The paper review process was efficient and fair. All the papers, both oral and poster papers, were excellent. The technical sessions were well organized.

IJCNN'92 Baltimore was a great big success, and it reconfirmed my believe that technical professionals could cooperate to promote this field called neural networks. The general feeling at the conference was that the joint conference was very much needed to bring together researchers from different disciplines to discuss the science and technology of neural networks.

I was also very happy to learn that there was a new beginning in cooperation, and that the neural network meetings in Beijing in 1992 and in Nagoya in 1993 will be called IJCNN! See you there.

ANN Bibliographies

The July 20 issue of Neuron Digest, a computer bulletin board edited by ***Marvin Cattell*** of the University of Pennsylvania included reference lists of neural networks applications in the fields of electric power and telecommunications.

To obtain access to *Neuron Digest,* send email to neuron-request@cattell.psych.upenn.edu

Electric Power Industry

An extensive bibliography of papers on applications of artificial neural networks in the electric power industry is being compiled by Dillard D. Ensley of Auburn University, who sent out a request for relevant paper titles on Internet via *Neuron Digest*.

There are many papers available describing research towards future implementations." Ensley said, citing a list of 38 papers he has already located.

"However, current implementations seem scarce. I have heard of attempts at installing 'demonstration' neural networks in power plants but so far have not been able to obtain much information on these."

If you have information on actual implementations of neural networks in the electric power industry or other significant research papers, or wish to obtain the survey results, please contact Ensley at densley@eng.auburn.edu.

He will post on the net a summary of the information received.

Telecommunications

Also in the July 20 issue of *Neuron Digest* were responses to a June 5 request by Atul K. Chhabra, NYNEX Science and Technology for papers on neural networks and/or machine vision applications in the field of telecommunications. They added up to a 3-page bibliography with over 80 entries. If you do not have access to the Neuron Digest bboard contact Mr. Chhabra (atul@-nynexst.com) .

The contributors to the bibliography, who came from around the globe, include:

Peter T. H. Chan
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Australia
(lynda@stoney.fit.qut.edu.au)

Calls for Papers

•***IEEE Winter Workshop on Nonlinear Digital Signal Processing.*** January 17-20, 1993. Tampere, Finland. ***Submissions***: 3 copies of a 2-page summary by October 1 to Petri Haavisto, Signal Processing Laboratory, Tampere University of Technology, P.O.B. 553, SF-33101 Tampere, Finland. Email: pjh@cs.tut.fi.
Fax: +358 31 161 857

•***ACNN'93: 4th Australian Conference on Neural Networks.*** Feb 1-3 1993, Melbourne Australia. *Submissions:* 4 copies of full papers by *August 28 1992*, to Agatha Shotam, Sydney University, Electrical Engineering, NSW 2006, Australia. Tel: 61 2 692 4214; fax: 61 2 660 1228; email: agatha@ee.su.oz.au

•***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, -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.

•***SPIE*** April 16-23, 1993, Orlando FL ***Applications of Neural Networks IV*** *Focus:* Real-world applications of ANNs and recent theoretical developments applicable to current applications. *Submissions:* Mail or Fax a 500 word abstract by September 14 to OE/Aerospace Science and Sensing '93, SPIE, PO Box 10, Bellingham, WA 98227 0010 Tel: 206 676 3290; FAX 206 647 1445; OPTO-LINK: 206 733 2998; Internet: spie@nessie.wwu.edu; Compuserve: 71630,2177. *Att: Steven K. Rogers, Conference Chair*

•***SPIE: Science of Artificial Neural Networks II.*** *Focus:* Recent theoretical developments. Submissions: Mail or fax 500 word abstract to the above address, *Att: Dennis W. Ruck, Conference Chair.*

•***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***

•***IWANN'93: International Workshop on Artificial Neural Networks.*** June 9-11, 1993 Barcelona Spain. Sponsors IFIP, *IEEE Neural Networks Council*, UK&RI Communication Ch. of IEEE, Spanish Computer Soc. ch. IEEE, AEIA (IEEE Affiliate Society). *Submissions*: 4 copies of full papers to Prof. Jose Mira, Dpto Informatica y Automatica, UNED, Senda del Rey, s/n, 28049 Madrid, Spain

•**Solid State Sensors and Actuators** June 7-10, 1993 Yokohama, Japan. *Sponsors*: Institute of Electrical Engineers of Japan and Japan Science Foundation. Submissions: 2 copies of a 2-page abstract before November 30, 1992 to the regional chairman. *Europe:* Prof. Jan-Ake Schweitz, Dept. of Technology, Uppsala University, Box 534, S-751 21 Uppsala, Sweden; *NA, SA, Africa & Australia:* Dr. Kurt Petersoen, Lucas NovaSensor, 105 Mission Court, Fremont CA 94539 USA; *Asia & all other regions:* Prof. Akio Sasaki; Secretariat TRANSDUCERS '93, c/o SANSEI International Inc., Fukide Bldg. No. 2, 1-21 Toranomon 4-chome, Minato-ku, Tokyo, 105 Japan.

•***14th Int. Conf. on Application and Theory of Petri Nets*** June 19-25, 1993 Chicago. *Submissions:* 8 copies by November 16, 1992 to Program Chair: Marco Ajmone-Marsan, Dipartimento di Elettronica, Politecnico di Torino, Corso Duca degli Abruzzi 24, I-10129 Torino Italy. Ph 39 11 5644032 Fax 312 413 0024 email: pn93@bert.eecs.uic.edu.

•***CBMS 93: IEEE Computer Based Medical Systems Symposium.*** July 13-16 1993. Ann Arbor Michigan. *Sponsors:* IEEE and Engineering in Medicine and Biology Society. *Submissions:* Timothy J. Kriewall. Ph.D., Sarns, 3M Health Care, 6200 Jackson Road, Ann Arbor MI 48106; 313 741 6276.

•***ICNN'93-Nagoya Japan International 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 chair: Prof. Kunihiko Fukushima (Osaka Univ.). Details will be announced in the forthcoming formal Call for Papers.

•***Medical Engineering VII.*** February 14-18 '93. Newport Beach CA. Sponsor; SPIE. 4 Conferences: Image Processing, PACS: Design and Evaluation; Physics of Medical Imaging; and Image Capture Formatting and Display. Submissions: 4 copies of abstract by 27 July 1992 to SPIE, Box 10, Bellingham WA 98227-0010. Tel 206 676 3290; FAX: 206/647-1445; Internet: spie@nessie.wwu.edu; Compuserve: 71620,2177

•**12th APEC Micromouse Contest.** March 10, 1993, San Diego. *Contact* Melissa Widerkehr, Courtesy Associates, 655 Fifteenth ST. NW, Washington DC 2005 USA Tel 202 347 5900.

•**ICNN 93: IEEE International Conference on Neural Networks.** March 28-April 1 1993. *See Announcement*

•***IEEE-FUZZ '93: 2nd IEEE Int'l Conf. on Fuzzy Systems.*** *See Announcemnt*

• **Fifth IFSA World Congress.** July 4-9 '93, Seoul, Korea. *Sponsor:* International Fuzzy Systems Association. *Submissions*: 4p. papers by *October 1* to respective area chairs: *Intelligent Systems:* James C. Bezdek, Dept. of Computer Science, Univ. of West Florida, Pensacola FL 32514, jbezdek@uwf.bitnet; *Engineering:* Prof. K. Hirota, Dept Instrument & Control Engineering, College of Engineering, Hosei University, Kajino-cho, Koganei-city, Tokyo 184 Japan, hirota@hrt.hosei.sc.jp; Mathematical Foundations: R. Lowen, Dept. of Mathematics and Informatics, University of Antwerp, RUCA, Groenenborgeriaan 171, 2020, Antwerpen Belgium, lowen@banrue60.bitnet.; Information Sciences: K.W. Oh, Dept. Coputer Science, Sogang University, C.P.O. Box 1142, Seoul, 100-611 Korea, email: kwoh@krsog.bitnet

•***Intelligent Vehicles '93.*** July 14-16 '93, Tokyo. *Sponsors :* IEEE and SAE. *Submissions*: 3 copies of 1 page abstract by December 15 '92 to Ichiro Masaki, Computer Science Dept., General Motors Research Laboratories, 30500 Mound Road, Warren MI 48090-9055 USA. Tel: 313-986-1466; FAX 313 986 9356; email masaki@gmr.com

• ***IROS 93: Int'l Conf. on Intelligent Robots and Systems.*** July 26-30 Yokohama Japan *Sponsor:* Robotics Society of Japan in coop. with IEEE Robotics and Automation Society and others. *Summission:* 4 copies of long (25pp max.) or short (10pp max.) by December 1, 1992 to either of the co-chairs: Masatsugu Kidode, Kansai Research Lab., Toshiba Corp., 8-6-26 Motoyama-Minami-cho, Higashinada-ku, Kobe; 658 Japan, tel: 81 78 435 3502; fax 81 78 435 3678 or Tomomasa Sato, Research Center for Advanced Science and Technology, University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo, 153 Japan, Tel 81 3 3481 4479 Fax: 81 3 3481 4584.

•***IEEE/Nagoya University WWW on Multiple/Distributed Robotic Systems: Architecture and Control for Coordination and Cooperation*** July 30-31, Nagoya Japan. Travel expenses for the authors of the best papers will be supported by WWW. *Submissions:* Send abstract to Prof Kazuhiro Kosuge, General Chair, WWW on MDRS, Dept. Mechano-Informatics and Systems, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-01, Japan, Tel: 81 52 781 5111, Ext. 6783; FAX 81 52 782 9243.

• ***Int'l Conf. on Advanced Mechatronics*** August 2-4, '93 Yokahama, Japan. *Submissions*: 3 copies of 800 word abstract by December 1, 1992 to : Prof. Jun'ichi Takeno, School of Science and Technology, Meiji University, 1-1-1 Higashi-ita, Tama-ku, Kawasaki-shi, Kanagawa-ken 214, Japan, Tel 044 934 9454; 044 934 7912 (Japan) International Tel/Fax 81 44 934 2880.

•***IJCAI92: 13th Int'l Joint Conf. on Artificial Intelligence.*** August 29-September 3, 1993. Chambery France. *Submissions:* 5 copies of full papers by November 1 1992 to Prof. Ruzena Bajcsy, GRASP Laboratory, University of Pennsylvania, 3401 Walnut Street, Room 303C, Philadelphia PA 19104 6228 tel 1 215 898 0370; fax 1 215 573 2048. email: bajcsy@central.cis.upenn.edu.

•***VRAIS '93: Vlirtual Reality Annual International Symposium September 18-22, 1993, Seattle.*** *Sponsor:* IEEE Neural Networks Council. *Submissions :* Technical Papers and Videos are invited: Send 5 copies (10p. max) of technical papers by December 1 1992. Send 2-3 minute video segment in 1/2 inch VHS or 1 inch Umatic format and 200 word abstract by February 1, 1992. Send papers and videos to Meeting Management, 5665 Oberlin Drive, Suite 110, San Diego CA 92121, Tel 619 453 6222, FAX 619 535 3880. *Tutorials:* Send two papge proposals by November 1 1992 to Dr. Blake Hannaford, Dept. of EE, FT 10, University of Washington, Seattle WA 98195 vraispub@uw-isdl.ee.washington.edu

• ***Software Engineering Standards Symposium. '93*** September 1993 *Sponsor:* IEEE Computer Society. Theme: Internationalization of Industrially Useful Software Engineering Standards (SES) *Submissions*: 6 copies of abstract of paper, panel session proposal, position paper or tutorial proposals to one of the Program cochairs by December 18, 1992. *Europe:* Tim Denvir, Translimina Ltd., 37 Orpington Road, Winchmore Hill, London N21 3PD +44 81 681 4774; Fax ((Int) +44 81 681 6814.; *Japan:* Dr. Akira Kumagai, Fujitsu Ltd, Tel: +81 3 3730 3185 FAX 81 3 3734 4161.; *USA and other*: Sal Mamone, Nynex Corp., 500 Westchester Ave, White Plains NY USA. Tel +1 914 683 2237 FAX +1 914 683 2191

•***Artificial Intelligence: An International Journal: Special Issue on Computational Theories of Interaction and Agency.*** Edited by Philip E. Agre (UC San Diego) and Stanley J. Rosenschein (Teleos Research) Topics include: Task-level robot sensing and action strategies, as well as projects that integrate classical robot dynamics with symbolic reasoning; Automata-theoretic formalizations of agent-environment interactions.; Studies of "active vision" and related projects that approach perception within the broader context of situated activity; Theories of the social conventions and dynamics that support activity; Foundational analyses of situated computation.; Models of learning that detect regularities in the interactions between an agent and its environment. *Submissions :* Philip E. Agre Department of Communication D-003 University of California, San Diego La Jolla, California 92093-0503 pagre@weber.ucsd.edu. by September 1, 1992 .

Calendar

•***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. Shenoi, 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.

• ***September 15-18 1992. ICARCV92: The Second International Conference on Automation, Robotics and Computer Vision.*** Singapore, ***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

IJCNN'92 Beijing

1992 International Joint Conference on Neural Networks

Beijing, China
November 3-6, 1992

IEEE

INNS

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

Sponsored by:
The IEEE Council on Neural Networks
The International Neural Network Society
The China Neural Networks Council
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.

Conference Co-Chairs
You Shou Wu, Tsinghua University, China
Shun-Ichi Amari, Tokyo University, Japan
Russell C. Eberhart, Research Triangle Institute, USA
Program Co-Chairs
YI In Zhong, University of Posts & Telecom., China
Harold Szu, INNS, USA
Organizing Co-Chairs:
Zong Sha, Chinese Institute of Electronics, China
Shiro Usui, Toyohashi University of Technology, Japan
International Advisory Co-Chairs:
Paul Werbos, National Science Foundation
Robert Marks II, University of Washington, USA
International Advisory Members:
Stephen Grossberg, Boston University
Teuvo Kohonon, Helsinki University
Bernard Widrow, Stanford University
Kunishio Fukushima, Osaka University

General Information: For further details you may write or fax:

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Beijing 100088, China
Tel: 201-3388 ext. 2203
Telex: 210431 CIE CN
Fax: 500-5233
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Biomedical Engineering
Research Triangle Institute
PO Box 12194
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Tel: 919-541-7123
Fax: 919-541-8746
E-mail: rce@rti.rti.org
or
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INNS President Elect
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Bethesda MD 20814
Tel: 301-394-3097
Fax: 301 394 3923
E-mail
btelfe@ulysses.nswc.navy.mil

Conference Registration

IJCNN'92 Beijing
Beijing International Convention Center
November 3-6, 1992

Please enclose a separate form for each individual enrollment and write a separate check for each person registering. Do not staple check to form. This form may be duplicated for additional registrants

Please Print (Circle One) Dr. Mr. Ms.
Last name _____
First Name/M.I. _____
IEEE/INNS Membership No. _____
(Must be completed to qualify for discount)
Affiliation _____
(For Name Badge)
Address _____
City _____ State _____ Zip _____
Country _____ E-mail _____
Telephone (_____) _____
Fax (_____) _____

CONFERENCE FEES

	By Sept.30 1992	After Sept. 30 1992
IEEE/INNS Member	325	375
Non-Member	375	425
Full-Time Student*	120	120

**Students must submit verification letter of full-time status from Department Head.*

TUTORIAL FEES
120 USD EACH BY SEPT. 30, 1992
140 USD EACH AFTER SEPT 30, 1992

Total Conference Fee Enclosed US $_____
Total Tutorial Fee Enclosed US $_____
TOTAL AMOUNT ENCLOSED U.S. $_____

Send registration form and payment to Dr. Russell C. Eberhart or Dr. Harold Szu at the address given
Passport No _____
Place Issued _____
Exp. Date _____

The organizer of the conference will offer six choices of post-conference tours to the fascinating "Golden Routes" of China to the conference attendees and accompanying persons so that you may select the cities you wish to visit, depending on the amount of time you can spend in China. Contact Dr. Eberhart or Dr. Szu for details regarding itineraries and prices.

First RNNS/IEEE Symposium on Neuroinformatics and Neurocomputing

RNNS

Rostov-on-Don, Russia — **Oct 7 - Oct 10, 1992**

JOINT SPONSORS:
IEEE Neural Networks Council
Russian Neural Networks Society

Conference Committee
Symposium Chair: Witali Dunin-Barkowski
International Chair: Robert Marks II
Program co-chairs: Alexander Frolov and Wesley Snyder
Local Committee Chair: Anatoly Kovalyov
Program Committee:

A. Amit	M. Klenin
S. Amari	R. Newcomb
J. Bezdek	A. Petrov
R. Borisyuk	L. Podladchikova
G. Carpenter	I. Rybak
A. Chernavsky	E. Tzanakou
R. Eckmiller	P. Simpson
N. Farhat	J. Taylor
T. Fukuda	S. Thomas
A. Gorban	A. Vedenov
A. Gutman	V. Yachno
M. Ito	

Technical Sessions

- **Natural Neural Systems Informatics**
- **Neurocomputer Perspectives**
- **Learning in Neural Networks**
- **Sensory Information Processing and Motor Control**
- **Neurocomputer Hardware**
- **Neural Information Theory and Coding**
- **Optimization Techniques**

Plenary Speakers
R. Hecht-Nielsen
M. Ito
A. Kalyaev

Symposium Schedule

Wednesday, October 7
Plenary Session: 10:00 am - 12:30 pm
Technical Session: 1:30 pm - 5:30 pm
Reception: 6:00 pm - 8:00 pm

Thursday, October 8
Technical Session: 8:30 am - 6:30 pm
Party: 7:00 pm - 10:00 pm

Friday, October 9
Fresh Air Session on a Tour Boat on the Don River: 9:00 am - 4:00 pm
Poster Session: 5:00 pm - 8:00 pm

Saturday, October 10
Plenary Session: 9:00 am - 1:00 pm

Accommodations

Most participants will be accommodated in hotels in central Rostov within walking distance of the Symposium centre.
Registration fee for participant includes admission to all sessions, and Proceedings.
Participants from the former USSR may pay fee and accommodations in Russian rubles. The fee amount will be announced at the beginning of the Symposium according to the current state of Russian currency.

Information

Requests for information should be addressed to either the **Symposium Chair**: Dr. Witali L. Dunin-Barkowsky, Director, A.B. Kogan Research Institute for Neurocybernetics
194/1 Stachka Ave.
344104 Rostov-on-Don, Russia
Telephone: (863 2) 280588
(863 2) 226836
Fax: (863 2) 244311
Telex: 123228 TEMR

or the **Program Chair**:
Wesley E. Snyder, Ph.D., Professor
Department of Radiology
Bowman Gray School of Medicine
Medical Center Boulevard
Winston-Salem, NC 27157-1022
Telephone: (919) 748-3908
Fax: (919) 748-2870
email: wes@mrips.medeng.wfu.edu

Symposium Registration

1992 RNNS/IEEE Symposium on Neuroinformatics and Neurocomputing
October 7-10, 1992
Rostov-on-Don, Russia.
(This form may be duplicated for additional registrants.) Participants are advised to register immediately in order to obtain a visa.

Last Name _____ First Name _____

Affiliation: _____

Address: _____

City/State: _____ Zip/Country: _____

Telephone: (_____) Fax: (_____ _____ Telex: _____
Arrival (to Moscow)
Date: _____ Flight: _____
Arrival (to Rostov)
Date: _____ Flight: _____
Departure (from Rostov)
Date: _____ Flight: _____
Departure (from Moscow)
Date: _____ Flight: _____

Symposia Fees

	Up to 8/31/92	After 8/31/92
For participant	$285	$335
Meals (lunch 6th-lunch 10th)	$100	$100
Please indicate preferred accommodation		
Deluxe		$120
Double for 1 or 2		$80
Single		$65

Please make check payable in US dollars to **1992 RNNS Symposium on Neuroinformatics** and mail with completed registration form prior to **August 31, 1992** to:

1992 RNNS/IEEE Symposium on Neuroinformatics
c/o Dmitry Kaplan
3819 165th Place SE
Bellevue, WA 98008-5859
USA

and Control Society (ICS), Singapore Section and other local professional organizations.
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.

- ***September 21-22 DARS'92:Int'l Symposium on Distributed Autonomous Robotic Systems.*** *Sponsor*: RIKEN: Institute of Physical and Chemical Research *Contact:* Hajima Asama, Chemical Eng. Lab., RIKEN, Hirosawa 2-1, Wako-shi, Saitama 351-01 Japan
- ***September 30-October 2, 1992 30th Annual Allerton Conference on Communications Control and Computing.*** University of Illinois, Champaign-Urbana. *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
- ***October 11-14 MILCOM '92: Communications: Fusing Command, Control and Intelligence.*** San Diego CA. *Sponsors*: IEEE Communications Society, and the Armed Forces Communication and Electronics Association. Contact: John Peckham, (619) 592-5153.
- ***October 13-16, 1992, Visualization in Biomedical Computing.*** Chapel Hill NC. *Sponsor:* Dept. of Computer Science, Univ. of North Carolina, Chapel Hill. *Contact:* 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
- ***October 14-18, 1992, 1st Int. Conf. on Fuzzy Theory & Technology: Control and Decision. Durham NC.*** *Contact:* FT&T'92, Paul P. Wang, Dept Electrical Engineering, Duke Univ., Durham NC 27706, Tel: 919 660 5259; FAX 919 660 5293, email ppw@dukee.egr.duke.edu
- ***October 19-23, 1992. Visualization'92.*** Sponsors: IEEE Computer Society Tech. Com on Computer Graphics in coop. w/ ACM. Contact: Carol Hunter, 510 423 9368, email chunter@llnl.gov
- ***November 3-6, 1992.*** **ICIIPS'92 Beijing: International Conference on Intelligent Information Processing and Systems.** *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, Beijing 100084, P.R. China. Tel: (86)2552451, ext 2877; Fax: (86)2568184
- ***November 2-4, 1992 ISCIS VII*** , Antalya, Turkey. *Sponsor:* EHEI METU Ecole des Hautes Etudes en Informatique, Middle East Technical Universite Rene Descartes, Paris, FRANCE University, Ankara, TURKEY. *Contact:* ISCIS VII EHEI, 45 Rue des Saint-Peres, 75006 Paris, FRANCE . E-mail : iscis@trmetu.-bitnet . Fax : (90 4) 2868624 . Tel : (90 4) 2237100 ext. 2079
- ***November 2 - 5, 1992 International Conference on Signal Processing Applications and Technology*** Cambridge, MA. U.S.A. *Contact:* DSP Associates 18 Peregrine Road Newton, MA 02159 U.S.A. Tel: (617) 964-3817 Fax: (617) 969-6689 e-mail: DSPWorld@world.std.com
- ***November 4-6, 1992. WNN92/Houston.*** Held in conjunction with SimTec92, near NASA/JSC, *Sponsor:* SCS; Co-sponsor NASA/JSC; Participating: IEEE-NNC; Co-operating SPIE and INNS. *Contact:* Mary Lou Padgett, Auburn University, 1165 Owens Rd., Auburn, AL 36830. Phone: (205) 821-2472 or 3488. FAX (205) 844-1809. Email: mpadgett@eng.auburn.edu.
- ***November 15-20, 1992. OE/Technology'92: An Applications Symposium on Optics, Electro-Optics, and Lasers in Industry. Sponsor: SPIE. Boston.*** Contact: SPIE, PO Box 10, Bellingham, WA 98227 0010
- ***November 23-5, 1992. ESORICS 92: European Symposium on Research in Computer Security.*** Toulouse France. *Contact:* Jean-Jacques Quisquater, AFCET-Esorics-92, 156 boulevard Pereire, 75017, Paris FRANCE. email: deswarte@laas.fr.
- ***December 2 - 4, 1992 Industrial Applications of Fuzzy Control and Intelligent Systems***, College Station, Texas, Sponsored by Center for Fuzzy Logic and Intelligent Systems Research, Texas A&M University in cooperation with North American Fuzzy Information Processing Society (NAFIPS). Program Co-Chairs: John Yen, Dept. of Computer Science, Texas A&M University, College Station, TX 77843-3112, Tel: (409) 845-5466 Fax: (409) 847-8578 E-mail: yen@cs.tamu.edu or Reza Langari, Dept. of Mechanical Engineering. Texas A&M University College Station, TX 77843-3123 Tel: (409)845-6918 Fax: (409)845-3081 E-mail: R0L5525@zeus.tamu.edu
- ***December 7-11, 1992.The Fifth International Symposium on Artificial Intelligence***. Cancun Mexico. Sponsor: ITESM (Instituto Tecnologico y de Estudios Superiores de Monterrey) Contact: Hugo Terashima, Program Chair Centro de Inteligencia Artificial, ITESM. Sucursal de Correos "J", Monterrey, N.L. 64849 MEXICO Tel.(52-83) 58-2000 ext. 5134 Telefax (52-83) 58-1400 Dial ext.5143 or 58-2000 Ask ext.5143 Net address: isai@tecmtyvm.bitnet or terashim@mtecv2.mty. itesm.mx.
- ***December 7-11, 1992 SecondInternational Conference on Simulation of Adaptive Behavior (SAB92)*** "From Animals To Animats" Ilikai Hotel, Honolulu, Hawaii *Sponsor:* Univ. of Hawaii. *Contact:* SAB92 Registration, Conference Center, University of Hawaii, 2530 Dole Street, Honolulu, HI 96822.
- ***December 14-17. NAFIPS'92: North American Fuzzy Information Processing Society.*** Puerta Vallarta, Mexico. *Contact M*rs. Carla Armstrong, Software Technology Branch/PT4, NASA- Lyndon B. Johnson Space Center, Houston TX 77058, Tel: 713 483 9071; FAX 713 483 5200 email: carmstrong@gothamcity.jsc.nasa.gov
- ***December 16-18, 1992 31st IEEE Conference on Decision and Control,*** , Westin LA Paloma Resort/Hotel, Tucson, AZ. *Contact:* Professor T. Basar, Coordinated Science Lab, Univ. of Illinois, 1101 West Spring field Ave., Urbana, IL 61801, (217) 333-3607, (217) 244-1764 (FAX), email: tbasar@markov.csl.uiuc.edu
- ***February 15-19 '93 IAS'93: International Conference on Intelligent Autonomous Systems.*** Pittsburgh. *Contact:* Mrs. Patty Mackiewicz, Robotics Institute, Carnegie Mellon Univ., Pittsburgh PA 15213; FAX: 412 621 1970;Tel: 412 268 3838; email patty@ri.cmu.edu.
- ***March 29- April2, 1993 AISB'93 : "Prospects for AI as the General Science of Intelligence"*** Birming-

ham, England. *Sponsor*: Society for the Study of Artificial Intelligence and the Simulation of Behaviour. *Submissions:* 3 copies by September 1 to Dr. William Edmondson: School of Computer Science, The University of Birmingham, Edgbaston, Birmingham, B15 2T T, U.K. phone +44-(0)21-414-4763; email EDMONDSONWH@vax1.bham.ac.uk

- ***March 28-April 1, 1993, ICNN: International Conference on Neural Networks.*** San Francisco. *Sponsor:* IEEE Council on Neural Networks. *See Announcement*

- ***March 28-April 1, 1993. 2nd International Conference on Fuzzy Systems.*** San Francisco. *Sponsor:* IEEE Council on Neural Networks. *See Announcement.*

- ***May 10-12, 1993 IMACS Symposium on Signal Processing and Neural Networks SPANN'93*** , Montreal, Canada *Contact:* Prof. Z. Jacyno, Department of Physics, University of Quebec at Montreal, P.O.Box 8888, Station A, Montreal, P. Quebec, Canada, HC 3P8.

- ***July 11-15, 1993 World Conference on Neural Networks (WCNN-93)*** (formerly IJCNN-93) Portland, Oregon . *Sponsor:* INNS with co-operation of IEEE Neural Networks Council. Deadline for paper submission: January 15, 1993. *Contact*: George Lendaris, Science & Eng., Portland State University, P.O. Box 751, Portland, OR 97207-0751, 503 725 4988, 4960, lendaris@eecs.ee.pdx.edu

- ***September 18-22, 1993. VRAIS - '93: Virtual Reality Annual International Symposium. Seattle.*** Sponsor: IEEE Council on Neural Networks. *See Call for Papers.*

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