ISDA 2003

Intelligent Systems Design and Applications

August 10-13, 2003
Tulsa, Oklahoma (USA)

Advanced Program & Call for Participation

Technical Sponsors

Oklahoma State University

COEITT (Center of Excellence in Information Technology and Telecommunications)

Foreword

Soft computing (computational intelligence) is the fusion/combination of methodologies, such as fuzzy logic (FL) including rough set theory (RST), neural networks (NN), evolutionary computation (EC), chaos computing (CC), fractal theory (FT), wavelet transformation (WT), cellular automata, percolation model (PM) and artificial immune networks (AIN). It is able to construct intelligent hybrid systems. It provides novel additional computing capabilities. It can solve problems (complex system problems), which have been unable to be solved by traditional analytic methods. In addition, it yields rich knowledge representation (symbol and pattern), flexible knowledge acquisition (by machine learning from data and by interviewing experts), and flexible knowledge processing (inference by interfacing between symbolic and pattern knowledge), which enable intelligent systems to be constructed at low cost (cognitive and reactive distributed artificial intelligences).

This conference puts emphasis on the design and application of intelligent systems. ISDA'03 include many papers, which deal with the design and application of intelligent systems solving the real world problems. This conference will remove the gap between theory and practice. I expect all participants will learn how to apply soft computing (computational intelligence) practically to real world problems.

Yasuhiko Dote
ISDA'03 – Honorary Chair

ISDA'03 General Chair's Message

On behalf of the ISDA'03 organizing committee, I wish to extend a very warm welcome to the conference and Tulsa in August 2003.! The conference program committee has organized an exciting and invigorating program comprising presentations from distinguished experts in the field, and important and wide-ranging contributions on state-of-the-art research that provide new insights into 'Current Innovations in Intelligent Systems Design and Applications". ISDA'03 builds on the success of last years. ISDA'02 was held in Atlanta, USA, August 07-08, 2002 and attracted participants from over 25 countries. ISDA'03, the Third International Conference on Intelligent Systems Design and Applications, held during August 10-13, 2003, in Tulsa, USA presents a rich and exciting program. The main themes addressed by this conference are:

- Architectures of intelligent systems
- Image, speech and signal processing
- Internet modeling
- Data mining
- Business and management applications
- Control and automation
- Software agents
- Knowledge management

ISDA'03 is hosted by the College of Arts and Sciences, Oklahoma State University, USA. ISDA'03 is technically sponsored by IEEE Systems Man and Cybernetics Society, World Federation on Soft Computing, European Society for Fuzzy Logic and Technology, Springer Verlag- Germany, Center of Excellence in Information Technology and Telecommunications (COEITT) and Oklahoma State University. ISDA'03 received 117 technical paper submissions from over 28 countries, 7 tutorials, 3 special technical sessions and 1 workshop proposal. The conference program committee had a very challenging task of choosing high quality submissions. Each paper was peer reviewed by at least two independent referees of the program committee and based on the recommendation of the reviewers 60 papers were finally accepted. The papers offers stimulating insights into emerging intelligent technologies and their applications in Internet security, data mining, image processing, scheduling, optimization and so on. I would like to express my sincere thanks to all the plenary speakers, tutorial presenters, authors and members of the program committee that has made this conference a success. Finally, I hope that you will find the conference to be a valuable resource in your professional, research, and educational activities whether you are a student, academic, researcher, or a practicing professional. Enjoy!

Ajith Abraham
ISDA'03 – General Chair

ISDA'03 Program Chairs' Message

We would like to welcome you all to ISDA'03: the Third International Conference on Intelligent Systems Design and Applications, being held in Tulsa, Oklahoma, in August 2003.

This conference, the third in a series, once again brings together researchers and practitioners from all over the world to present their newest research on the theory and design of intelligent systems and to share their experience in the actual applications of intelligent systems in various domains. The multitude of high quality research papers in the conference is testimony of the power of the intelligent systems methodology in problem solving and the superior performance of intelligent systems based solutions in diverse real-world applications.

We are grateful to the authors, reviewers, session chairs, members of the various committees, other conference staff, for their invaluable contributions to the program. The high technical and organizational quality of the conference you will enjoy could not possibly have been achieved without their dedication and hard work.

We wish you a most rewarding professional experience, as well as an enjoyable personal one, in attending ISDA'03 in Tulsa.

Andrew Sung
New Mexico Inst. of Mining and Technology
USA

Lakhmi Jain
University of South Australia
Australia

Gary Yen
Oklahoma State University USA

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Nikos Lagaros, National Technical University of Athens, Greece

General information about ISDA'03

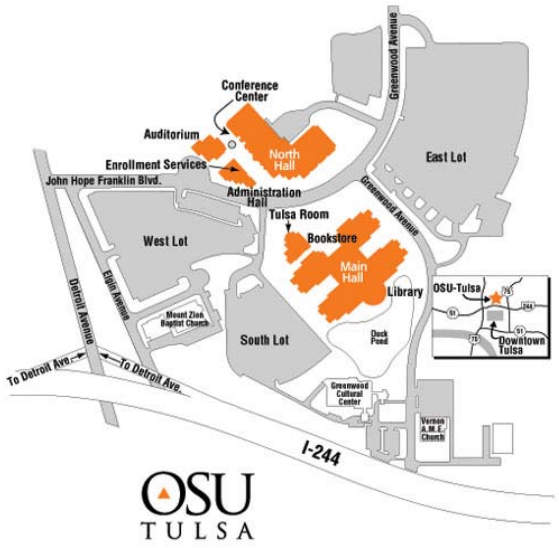
Intelligent Systems Design and Applications (ISDA 2003) is the third International conference that brings together international computational intelligence/ soft computing / artificial Intelligence researchers, developers, practitioners, and users. The aim of ISDA 2003 is to serve as a forum to present current and future work as well as to exchange research ideas in all areas of computational intelligence including design of artificial neural networks, fuzzy systems, evolutionary algorithms, hybrid computing systems, intelligent agents, and their applications in science, technology, business and commercial.

Program at a Glance

The program for this conference consists of a morning session, and an afternoon session, each of 3-4 hours duration arranged in 2 parallel tracks over three days (Monday, August 11, Tuesday, August 12 and Wednesday, August 13), 5-6 papers of 25 minutes duration each will be presented in each session. There will be 60 papers presented at the conference from a total submission of 117 manuscripts. Six tutorials are offered on Sunday, August 10. Six plenary lectures are presented by distinguished researchers in the field of Intelligent Systems, two each (morning and evening) on all the three conference days. There will be two panel discussions organized on Tuesday afternoon after the plenary lecture. Conference banquette will be held on Tuesday after the evening session at Adams Mark Hotel, Tulsa.

Conference Venue and Facilities

Venue for ISDA'03 will be Oklahoma State University – (Tulsa campus) which is located in Tulsa's historic Greenwood neighborhood near the downtown business community. The OSU-Tulsa Conference Center offers easy access, comfort and state-of-the art technology. The OSU-Tulsa campus is adjacent to the Greenwood Cultural Center and the Brady Arts District in one of Tulsa's most unique settings. http://www.osu-tulsa.okstate.edu/current/conference.asp



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Plenary Lecture I

Techniques for Data Mining the Internet to Support Situation Awareness for Homeland Security

Ronald Yager, Iona College, New York

Abstract: The vast amount of data being captured via the Internet and through other digital sources has made the mining of this data a very significant task. The importance of this has been amplified with an increased need for situation wareness. In this talk we introduce tools that help in the data mining process. We look at some clustering techniques, particularly the mountain method. We describe this method and show how it can help in rule generation. Then we consider a new approach to learning and adaption based on the participatory learning method.

Biography

Ronald R. Yager is a fellow of the IEEE, the New York Academy of Sciences and the Fuzzy Systems Association. He has served at the NSF as program director in the Information Sciences program. He was a NASA/Stanford visiting fellow as well as a research associate at the University of California, Berkeley. He has served as a lecturer at NATO Advanced Study Institutes. He received his undergraduate degree from the City College of New York and his Ph. D. from the Polytechnic University of New York. Currently, he is Director of the Machine Intelligence Institute and Professor of Information and Decision Technologies at Iona College. He is editor and chief of the International Journal of Intelligent Systems.

He serves on the editorial board of a number of journals including the IEEE Transactions on Fuzzy Systems, Neural Networks, Data Mining and Knowledge Discovery, IEEE Intelligent Systems, Fuzzy Sets and Systems, the Journal of Approximate Reasoning and the International Journal of General Systems. He is one of the co-founders of the conference on Information Processing and the Management of Uncertainty (IPMU). He has published over 500 articles and fifteen books. In addition to his pioneering work in the area of fuzzy logic he has made fundamental contributions in decision making under uncertainty and the fusion of information. His current research interests include the development of technologies for a more intelligent internet (E-Commerce, data mining, information retrieval) aggregation theory, decision making under uncertainty and higher order information fusion.

Plenary Lecture II

Growing and Pruning in Sequential Learning Neural networks

Saratchandran P, Nanyang Technological University, Singapore

Abstract: Artificial Neural Networks (ANNs) have gained much popularity in recent times due to their ability to solve many complex problems directly from the input-output data and their inherently simple and parallel topological structure. Although several learning algorithms have been proposed in the literature for training ANNs, selection of a particular learning for an application is often difficult, as it needs to meet the required accuracy and speed for that application. Sequential learning is generally preferred to batch learning as they are computational efficient and also avoid retraining whenever new data is received. A significant contribution to sequential learning was made by Platt through the development of a *growing* network called Resource Allocation Network (RAN) in which the hidden neurons are added sequentially based on the 'novelty' in the new data. A significant improvement to RAN was made by Yingwei et al by introducing a pruning strategy based on the relative contribution of the hidden neurons to the network out put. The resulting network is a sequential *growing and pruning* network and produces a highly parsimonious structure.

This talk gives an exposition of these sequential learning schemes and more importantly their practical applications in the areas of signal processing (magnetic recording), communication (equalization), control (flight control) and computer networks (ATM traffic).

Biography

P.Saratchandran obtained his BSc(Eng) (First Class) from Regional Engineering College Calicut, India and MTech (First class) from Indian Institute of Technology Kharagpur, India in Electrical Engineering. He subsequently obtained a MSc (Distinction) in Systems Enginering from the City University, London and a Ph.D in the area of Adaptive Control from Oxford University UK. He worked for two years as a scientist with the Indian Space Research Organisation and spent five years as a Senior Design Engineer with the Hindustan Aeronautics Ltd; India designing defence related avionics systems. From 1984 to 1990 he worked in Australia for various defence industries as a Systems Consultant and Manager developing real-time software/systems for the Australian Defence forces (RAAF, RAN) and the Defence Science and Technology Organisation (DSTO). During this period he was also a Visiting Fellow at the Department of Computer Science and Mathematics at the Macquarie University in Sydney ,Australia. Since 1990 he is with the Nanyang Technological University, where he is an Associate Professor.

P. Saratchandran has more than 100 publications in refereed conferences and prestigious journals. Two of his papers have won best paper awards in International conferences. He has also authored four books in the area of neural networks. He gave the invited plenary talk at the Second International Conference on Neural and Parallel Computations held in Atlanta, USA, in 2002. He has also been actively engaged with the local defense industry through short courses and projects. He is a Senior member of the IEEE and is also an Editor for the journal 'Neural Parallel and Scientific Computations'. His interests are in Neural Networks, Machine learning, Parallel computing and Control. He is listed in the Macquarie Who's Who in the world and in the Leaders in the World of the International Biographics Centre, Cambridge, UK.

Plenary Lecture III

Intelligent Hybrid Systems for Nonlinear Time Series Analysis and Prediction Using Soft Computing

Yasuhiko Dote, Muroran Institute of Technology, Japan

Abstract: Soft computing (SC) is an evolving collection of methodologies, which aims to exploit tolerance for imprecision uncertainty, and partial truth to achieve robustness, tractability, and low cost. SC provides attractive opportunity to represent the ambiguity in human thinking with real life uncertainty. Fuzzy logic (FL) Neural Networks (NN), and Evolutionary Computation (EC) are the core methodologies of soft computing. However, FL, NN, and EC should not be viewed as competing with each other, but synergistic and complementary, instead. SC is actually the combination or fusion of each methodology, which yields new computational capabilities (hybrid systems). Soft computing is causing a paradigm shift (breakthrough) in engineering and science fields since it can solve problems that have not been able to solved by traditional analytic methods (Tractability (TR)). In addition, SC yields rich knowledge representation (symbols and patterns), flexible knowledge acquisition (by machine learning from data and by interviewing experts), and flexible knowledge processing (inference by interfacing between symbolic and pattern Knowledge), which enable intelligent systems to be constructed at low cost (high machine intelligence quotient (HMIQ)): cognitive distributed artificial intelligence. Later, chaos computing and immune networks were added to explain so-called complex systems. This borrows ideas from biology, is so-called reactive distributed artificial intelligence. This plenary talk starts with neuro- fuzzy hybrid systems (FN) for time series analysis and prediction. By taking advantages of fuzzy systems and neural networks, a fast and accurate Sugeno's type-I fuzzy system (Type-I fuzzy system) is implemented with the combination of the Gaussian radial basis function network(GP-RBFN) and the time delayed neural network (TDNN), which is based on local modeling using fast general parameter(GP) learning and adaptive algorithms. The proposed GP algorithm applied to adaptation and learning for neural networks is very suitable to parameter optimization. of such local linear models in blended multiple model structure. It is applied to a fault detection application. It is experimentally confirmed that the developed fuzzy neural network is more accurate and faster than the RBFN. Then it is followed by FN + chaos computing, FN +fractal computing, FN + wavelet, FN + immune network, GMDH + genetic programming. Lastly, data mining techniques for nonlinear time series analysis and prediction are discussed. . on the basis of Zadeh's proposal: i.e., "From Manipulation of Measurements to Manipulation of Perceptions-Computations with Words", that is a data mining technology, knowledge easily comprehensible by humans is extracted by obtaining the features of the time series using a Hurst exponent ,a fractal analysis method, , and an autocorrelation analysis method. In order to extract the knowledge, decision-making rules comprehensible by humans using the features are derived with rough set theory. Finally the knowledge is embedded into the structure of the Time Delayed Neural Network (TDNN). The excellent prediction accuracy is obtained.

Biography

Yasuhiko Dote received the B.S. degree in electrical engineering from Muroran Institute of Technology, Muroran, Japan, and the M.S. and Ph.D. degrees from the University of Missouri, Columbia, Missouri,in 1963,1972, and 1974, respectively.

From 1963 to 1973 he had been employed by the Yaskawa Electric Manufacturing Co., Ltd., Japan. In 1974 he was Visiting Engineer at the Massachusetts Institute of Technology, Cambridge, MA. He was Visiting Researcher at the University of Missouri, Columbia, MO. in 1979 and at the Engineering Science Department of Oxford University,

UK, in 1980. In 1983 he was Visiting Professor and Consultant at the United Nations Water and Power Research Station, Puna, India. In 1989 he served as Visiting Professor at the Power Electronics Application Center, University of Tennessee, Knoxville, TN. April 1, 1999 through March 31,2004 he has been assigned as a Docent (Soft Computing Methods in Industrial Applications) at Helsinki University of Technology, Finland. He was a visiting professor at Helsinki University of Technology, Finland Sept.1 through Dec.31, 2000.

At present, Dr. Dote is Professor of Computer Science and Systems Engineering at the Muroran Institute of Technology, Muroran, Japan. He had remained Chairman of the Modern Control Theory Application Survey Committee in Institute of Electrical Engineers of Japan for three years. He was Chairman of the Soft Computing Application to Industry Survey Committee. He was Associate Editor at Large of the IEEE Transactions on Industrial Electronics. He was General Chairman of the IEEE International Workshop on Neuro Fuzzy Control, held on March 22-23, 1993 at Muroran, of the International Workshop on Soft Computing in Industry, Muroran, Japan, held on April 27-28,1996 and June 16-18,1999.He was International Co-Chair of the International Workshop on Soft Computing in Engineering Design and Manufacturing on the internet, 21-30,June 1998 and September 21-30,1999. He is establishing the World Internet Federation of Soft Computing with his research colleagues under the advice of Dr.L.A.Zadeh. He is a member of Editorial Board of the International Journal of Computational Intelligence and Applications, Imperial College Press. He is a guest editor of the Special Issue on Soft Computing-Industrial Innovations of the Proceeding of the IEEE, Vol.89, Issue 9,September, 2001.

Dr. Dote has published over 60 technical papers on drive systems and has five books on motion control on his credit. His research interest lies in the field of intelligent control methods (soft computing) applied to motor drive and motion control systems. He is a member of the IEE,Japan and IEEE.

Plenary Lecture IV

Knowledge on Demand: Role of Soft Computing

Antony Satyadas, IBM, USA

Abstract: The potential of "knowledge on demand" is significant and of interest to CEOs and vendors alike. Key "on demand" attributes include dynamic sense and respond capabilities, flexible processes and cost structures, and resilient operation. These requirements are driving innovations in grid, autonomic, and utility computing. The knowledge aspect depends on business processes, people and their associated roles, and related technologies for collaboration, learning, and expertise. This is bringing a new focus on cognition with emphasis on oft computing. This talk will focus on the vision, gaps and opportunities.

Biography

Antony Satyadas (senior member, IEEE) is a Program Director, driving On Demand Workplace industry solutions in *IBM Corporation*. His 19 years of consulting, marketing and research expertise includes Cognizant Enterprise, Smart Component Architectures, CAD/CAM, and large-scale e-business solutions. Antony conducts courses and "time-to-value" workshops worldwide in this area for IBM, KM World, IEEE, and AIAA. His prior IBM roles include Knowledge discovery business leader, Channels and offering execution leader for e-learning, Director for Lotus knowledge management initiatives, Director of Lotus consulting solution strategies, and Senior consulting IT architect for Americas. Before joining IBM, Antony provided technical leadership in corporations such as *Perot Systems*, *Bellsouth*, *HCL*, and *OMC Computers*; research innovations as Principle investigator in *US Department of Energy* and researcher at the *University of Alabama*. He also was the Chief Architect of *Flexible Intelligence Group*, an entrepreneur effort focused on soft computing software tools and intelligent agent technologies and applying them to solve prediction, control, and decision support problems in diverse industries.

Antony has more than 45 publications in books, international journals, industry magazines, and conference proceedings. Active with Industry Analysts and Press, Invited member of technical committees in international organizations including *American Institute of Aeronautics and Astronautics* (AIAA); associate editor for *Oxford University Press, Elsevier*, *Applied Technology in Business* Journal; co-editor of special issues for *IEEE SMC* and *Elsevier* journals; invited keynote speaker to various conferences/organizations such as *NASA, US Department of Treasury*; member of international program/scientific committees. His current research interest is in applying Cognizant Enterprise capabilities (includes adaptive enterprise, KM, smart BPM, and HPC paradigms for soft computing) to address tactical and strategic business challenges and nurture change.

Plenary Lecture V

Secure Transmission using All-or-Nothing,of Data (STAND)

Sugata Sanyal, Tata Institute of Fundamental Research, India

The only information-theoretically secure manner of data transmission discovered till now is the one-time pad. Owing to stringent demands on key management, its implementation has been found to be tough. Using the concept of the All-or-Nothing Transform (AONT), we provide a simple implementation of the one-time pad. Our algorithm assures information-theoretically secure data transmission over an insecure channel. This result follows directly from the properties of the reversible function 'xor' and the linear-AONT. Our algorithm is also far more efficient and less computationally expensive as compared to typical encryption algorithms like AES.

Biography

Sugata Sanyal received his Bachelor of Engineering degree with first class honors from Jadavpur University, India. He went on to do his M.Tech. degree in Computers and Control Engineering at the Indian Institute of Technology, Kharagpur. He received his Ph.D. degree for his work in "Computer Architecture: Some Aspects of Fault Tolerance and Coding Techniques" from the University of Mumbai, India.

In 1973, he joined the Tata Institute of Fundamental Research, Mumbai, India and has remained there ever since. He is now a member of the Faculty in the School of Technology and Computer Science in the institute. Throughout his career, he has functioned in his capacity as a Senior Adviser to many leading companies like Crompton and Greaves Ltd., NELCO, Tata Electric Company to name a few, and is part of the Technical Boards of numerous others like Unit Trust of India. He has undertaken numerous projects in Computer Science for various organizations and government, prominent among them being "Design of Air Sector Data Handling System" for ECIL at New Delhi, "MathBraille" for the Government of West Bengal, and "Design of a high-reliability micro programmed bit-slice microprocessor-based computer" which was used at the Cyclone Warning Radar Centre at Chennai. He has functioned as a guide and researcher to many students from the Indian Institutes of Technology, Indian Institute of Science and the University of Mumbai. His projects at TIFR span the fields of Computer Security, Computer Architecture, Information Theory, and Speech Processing. He has published numerous research papers in leading national and international journals and conferences, as well as delivered lectures in diverse topics at some of the leading institutions of the country. He is the Associate Editor of INFORMATICA, an international journal of computing and informatics. He is also the editor of International Journal of High Speed Computing (IJHSC). He has served on the Coordinating Committee of various conferences like TENCON 1989, Mumbai and TELEMATICS 1987, Trieste and presently an Advisor of an International Conference, Computers and Devices for Communication (CODEC 2004). He has received many awards for his contributions to Computer Science and Engineering, including the VASVIK award for Electrical, Electronics Sciences and Technologies in 1985.

Plenary Lecture VI

Intelligent Agent Technologies for User Support and Peer-to-Peer Computing

Sandip Sen, University of Tulsa, USA

Abstract: Agents provide a new paradigm for developing software applications that involve delegation of tasks and responsibilities to computer systems. An intelligent agent is an autonomous, proactive, utility-maximizing entity that can, given user preferences and goals, autonomously plan and execute actions to achieve those goals effectively and efficiently. In this talk we will present overviews of some theoretical issues and practical applications involving intelligent agent systems that we have been investigating at the MultiAgent SysTEms ReSearch group (MASTERS) at the University of Tulsa. Theoretical frameworks to be presented include technologies that allow peer-level agents to negotiate agreements and resolve disputes. Application topics include technologies enabling the development of robust recommender systems and mechanisms that allow bidding for bundles of goods in online auctions. The emphasis of the talk will be on identifying reusable, effective scientific approaches and technologies for intelligent agent systems.

Biography

Sandip Sen is an Associate Professor of Computer Science in the University of Tulsa with primary research interests in multiagent systems, machine learning, and genetic algorithms. He completed his PhD in the area of intelligent, distributed scheduling from the University of Michigan in December, 1993. He has authored more than 125 papers in workshops, conferences, and journals in several areas of artificial intelligence. In 1997 he received the prestigious CAREER award given to outstanding young faculty by the National Science Foundation. He has served on the program committees of most major national and international conferences in the field of intelligent agents including AAAI, IJCAI, ICMAS, AA, AAMAS, ICGA, etc. He was the co-chair of the Program Committee of the 5th International Conference on Autonomous Agents held in Montreal Canada in 2001. He regularly reviews papers for major AI journals and serves on the panels of the National Science Foundation for evaluating agent systems related projects. He has chaired multiple workshops and symposia on agent learning and reasoning. He has presented several tutorials on multiagent systems in association with the leading international conferences on autonomous agents and multiagent systems. He was also invited to lecture on the topic of learning agents in the First (1999, Utrecht, Netherlands), Second (2000, Saarbrucken, Germany) and Fourth (2002, Bologna, Italy) European Agent Systems Summer school, the First American Agent Systems School (2002, Marina del Ray, California, USA), and the Melbourne Agent System School (2003, Melbourne, Australia).

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ISDA'03 Tutorials

Tutorial 1: Analysis, Optimization, and Verification of Real-Time Rule-Based Systems

Albert Cheng, University of Houston, USA

Abstract. With the rapid increase in the use of embedded computers in time-critical systems ranging from the anti-lock braking controller in automobiles to the on-board safety mechanism in the Space Shuttle, the ability of these real-time monitoring and control computers to compute results on time becomes as important as the ability of these computers to compute correct results whenever needed. Since these embedded computers are used to perform increasingly complex monitoring, diagnosis, and control functions, rule-based expert systems are increasingly used in the implementation of these embedded computer systems. Unfortunately, the on-line performance of a rule-based expert system is highly unpredictable in a real-time environment owing to the fact that the control flow of the rules in these systems is embedded in the data and cannot be easily deduced. This is not acceptable in a hard real-time system where the failure to meet a single deadline may be catastrophic. This tutorial presents the basis of the technology for building the next generation of real-time expert systems capable of performing complex monitoring and control functions in a real-time environment while meeting all specified timing constraints.

Tutorial 2: Geometric Graphs for Instance-Based Learning

Godfried Toussaint, McGill University, Canada

In the typical nonparametric approach to pattern classification and instance-based learning, random data (the training set of patterns) are collected and used to design a decision rule (classifier). One of the most well known such rules is the k-nearest-neighbor decision rule also known as lazy learning and cased based reasoning). With this rule an unknown pattern is classified into the majority class among its k-nearest neighbors in the training set. Several questions related rule have received considerable attention over the years. It turns out that almost all of them can be solved elegantly and efficiently using proximity graphs. Such techniques appear not to be well known in the knowledge engineering, data mining and machine learning communities. One objective of this tutorial is to bring such techniques to light. Another is to show how such techniques can be made to be Bayes optimal.

Tutorial 3: Automatic Recognition of Natural Speech

Douglas O'Shaughnessy, University of Quebec, Canada

Abstract. The automatic conversion of natural conversational speech into text is a computer task on the verge of finding wide commercial application. Current automatic speech recognition (ASR) systems are still quite limited in their capacity to handle natural speech, but applications are nonetheless growing each year. For an ISDA audience, this tutorial will discuss the modern techniques of automatic speech recognition, emphasizing the breadth of knowledge needed to approach near-human performance in this complex task. We will review essential aspects of human speech production from the acoustic-phonetic point of view, pertinent speech analysis methods (e.g., mel-cepstrum), statistical methods (e.g., hidden Markov models), and language models. We will describe the strengths and weaknesses of each technique, and attempt to predict future trends, in which more structure will likely be imposed on techniques, which so far have been mostly driven by mathematical simplicity. In all aspects of the tutorial, we emphasize that communications principles are the basis for many decisions in how to design ASR.

Tutorial 4: Knowledge Commerce

Suliman Hawamdeh, Nanyang Technological University, Singapore

Abstract. Knowledge and innovation played an important role in the development of society through history. The transformation from agrarian society to industrial society to information and knowledge society has largely been brought about as a result of accumulation of knowledge and the products and services derived from the knowledge process. Knowledge commerce is a relatively new term that looks at leveraging knowledge in business. It encompasses the sales and transaction of knowledge products as well as capitalizing on knowledge to improve

products and services. Knowledge commerce goes beyond e-commerce to look at the issues that make e-commerce successful. Some of these include customer capital and customer relation management, Internet business model and Internet strategies. It also looks at the knowledge embodied in processes and practices within the organization. The performances of the methods developed are assessed on the dynamic models of several nonlinear systems, whose dynamic equations are assumed to be unknown throughout the results presented. In the tests, the alleviation of the adverse effects of observation noise and varying payload conditions are studied.

Tutorial 5: Information Assurance

Andrew H. Sung and Srinivas Mukkamala, New Mexico Tech, USA

Abstract. As a result of the growing awareness of computer security, the reported rapidly increasing incidents of security breaches and malicious attacks, and even the threat of cyber terrorism, there is an increasing need for governments, organizations, enterprises, and individuals to employ enhanced security measures and security devices to protect their computer systems and information assets. Thus, information security and the broader area of information assurance have become timely research topics, to which the techniques of intelligent systems are of great interest due to their superior potential for solving many of the problems in information security. This tutorial covers the basic concepts and issues of information assurance. A general introduction to the common topics will be presented, followed by an in-depth coverage of selected topics on firewalls, intrusion detection, cryptography and steganography, and wireless network security, with emphasis on the application of intelligent systems techniques.

Tutorial 6: Design, Development and Implementation of Question Answering Systems

Zhiping Zheng, Saarland University, Germany

Abstract. Question answering (QA) research is a promising task in computational linguistics area. However, it is still in its very early stage. More and more industrial and/or academic research groups join in the research and several sub-intelligent systems are now on the Web. Although most QA systems have similar structure, every system is different from others, not only the performance, but also the focus, design method, knowledge base and many others. Thus, some of the experiences of building QA systems are very useful to other researchers but very difficult to summarize. This tutorial is intended to bring some newest development and research in this area and exhibit many real examples to look inside real QA systems closely and from different aspects, synthesize research results and experiences from different research groups, summarize what are possible, what are helpful, and what are essential in building a real-world QA system.

Intelligent Systems Design and Applications

Venue: Oklahoma State University, 700 N Greenwood Avenue, Tulsa, Oklahoma 74106
Dates: August 10-13, 2003

Sunday, August 10, 2003

08:00 – 09:00 AM	**Conference / Tutorial Registration**
09:00 – 12:30	Conference Tutorial – 1 **Analysis, Optimization, and Verification of Real-Time Rule-Based Systems** *Albert Cheng, University of Houston, USA*
	Conference Tutorial – 2 **Geometric Graphs for Instance-Based Learning** *Godfried Toussaint, McGill University, Canada*
	Conference Tutorial – 3 **Automatic Recognition of Natural Speech** *Douglas O'Shaughnessy, University of Quebec, Canada*
14:00 – 17:30	Conference Tutorial – 4 **Knowledge Commerce** *Suliman Hawamdeh, Nanyang Technological University, Singapore*
	Conference Tutorial – 5 **Information Assurance** *Andrew H. Sung and Srinivas Mukkamala, New Mexico Tech, USA*
	Conference Tutorial – 6 **Design, Development and Implementation of Question Answering Systems** *Zhiping Zheng, Saarland University, Germany*

Monday, August 11, 2003
8:00 AM – 4:00 PM
Registration

Monday, August 11, 9:00 AM – 9:20 AM

Welcome Greetings

Monday, August 11, 9:30 AM – 10:30 AM (Plenary Session - 1)

Techniques for Data Mining the Internet to Support Situation Awareness for Homeland Security

Speaker: Ronald Yager, Iona College, New York
Session Chair: Yasuhiko Dote, Muroran Institute of Technology, Japan

Coffee Break: 10:30 AM – 11:00 PM

Parallel Technical Sessions: Monday, August 11, 11:00 AM – 01:00 PM

Session 1.1 (Room A): Connectionist Paradigms and Machine Learning
Chair: Saratchandran P.

New Model for Time-series Forecasting using RBFS and Exogenous Data
Juan Manuel Gorriz, Carlos G. Puntonet, J. J. G. De La Rosa and Moises Salmeron

On Improving Data Fitting Procedure in Reservoir Operation using Artificial Neural Networks
S. Mohan and V. Ramani Bai

Automatic Vehicle License Plate Recognition using Artificial Neural Networks
Cemil Oz and Fikret Ercal

Neural Network Predictive Control Applied to Power System Stability
Steven Ball

Identification of Residues Involved in Protein-Protein Interaction from Amino Acid Sequence - A Support Vector Machine Approach
Changhui Yan, Drena Dobbs and Vasant Honavar

From Short Term Memory to Semantics - a Computational Model
Parag C. Prasad and Subramani Arunkumar

Session 1.2 (Room B): **Fuzzy Sets, Rough Sets and Approximate Reasoning**
Chair: Ronald Yager

Axiomatization of Qualitative Multicriteria Decision Making with the Sugeno Integral
D. Iourinski and F. Modave

A Self-learning Fuxxy Inference for Truth Discovery Framework
Alex Sim Tze Hiang, Vincent C. S. Lee, Maria Indrawan and Hee Jee Mei

Exact Approximations for Rough Sets
Dmitry Sitnikov, Oleg Ryabov, Nataly Kravets and Olga Vilchinska

Correlation Coefficient Estimate for Fuzzy Data
Yongshen Ni and John Y. Cheung

Lunch: 01:00 PM – 02: 30 PM

Monday, August 11, 2:30 PM – 03:30 PM (Plenary Session – 1I)
Growing and Pruning in Sequential Learning Neural networks

Speaker: Saratchandran P, Nanyang Technological University, Singapore
Session Chair: Gary Yen, Oklahoma State University, USA

Coffee Break: 03:30 PM – 04:00 PM

Parallel Technical Sessions: Monday, August 11, 04:00 PM – 05:30 PM

Session 1.3 (Room A): Internet Security
Chair: Andrew H. Sung

Real-time Certificate Validation Service by Client's Selective Request
Jin Kwak, *Seungwoo Lee and Dongho Won*

Internet Attack Representation using a Hierarchical State Transition Graph
Cheol-Won Lee, Eul Gyu Im and Dong-Kyu Kim

A Secure Patch Distribution Architecture
Cheol-Won Lee, Eul Gyu Im, Jung-Taek Seo, Tae-Shik Sohn, Jong-Sub Moon and Dong-Kyu Kim

Intrusion Detection Using Ensemble of Soft Computing Paradigms
Srinivas Mukkamala, Andrew H. Sung and Ajith Abraham

Session 1.4 (Room B): Intelligent Web Computing
Chair: Yan-Qing Zhang

Real Time Graphical Chinese Chess Game Agents Based on the Client and Server Architecture
Peter Vo, Yan-Qing Zhang, G. S. Owen and R. Sunderraman

DIMS: an XML-Based Information Integration Prototype Accessing Web Heterogeneous Sources
Linghua Fan, Jialin Cao and Rene Soenen

A Frame-Work for High-Performance Web Mining in Dynamic Environments Using Honeybee Search Strategies
Reginald Walker

A Framework for Multiagent-Based System for Intrusion Detection
Islam M Hegazy, Taha Al-Arif , Zaki T. Fayed and Hossam M. Faheem

Tuesday, August 12, 2003
8:00 AM – 4:00 PM
Registration

Tuesday, August 12, 09:00 AM – 10:00 AM (Plenary Session – III)

Intelligent Hybrid Systems for Nonlinear Time Series Analysis and Prediction Using Soft Computing

Speaker: Yasuhiko Dote, Muroran Institute of Technology, Japan
Session Chair: Antony Satyadas, IBM, USA

Coffee Break: 10:00 AM – 10:30 AM

Parallel Technical Sessions: Tuesday, August 12, 10:30 AM – 01:00 PM

Session 2.1 (Room A): Agent Architectures and Distributed Intelligence
Chair: Sandip Sen

An Adaptive Platform Based Multi-Agents for Architecting Dependability
Samir Benarif, Amar Ramdane-Cherif and Nicole Levy

Stochastic Distributed Algorithms for Target Surveillance
Luis Caffarelli, Valentino Crespi, George Cybenko, Irene Gamba and Daniela Rus.

What-if Planning for Military Logistics
Afzal Upal

Effects of Reciprocal Social Exchanges on Trust and Autonomy
Hexmoor Henry and Prapulla Poli

Session 2.3 (Room A): Computational Intelligence in Management
Chair: Raj Kumar

Using IT To Assure a Culture For Success
Raj Kumar

Gender Differences in Performance Feedback Utilizing an Expert System: A Replication and Extension
Tim Peterson, David D. Van Fleet, Peggy C. Smith and Jon W. Beard

Session 2.2 (Room B) Data mining, Knowledge Management and Information Analysis
Chair: Suliman Al-Hawamdeh

NETMARK: Adding Hierarchical Object to Relational Databases
David A. Maluf, Peter B. Tran, Tracy La and Mohana Guram

Academic KDD Project LISp-Miner
Milan Simunek

Performance Evaluation Metrics for Link Discovery Systems
Afzal Upal

Generalizing Association Rules: A Theoretical Framework and an Implementation
Antonio Badia and Mehmed Kantardzic

New Geometric method for Blind Separation of Sources
Manuel Rodriguez-Alvarez, Fernando Rojas, Carlos G. Puntonet, F. Theis, E. Lang and R. M. Clemente

Codifying the ""Know How"" Using CyKnit Knowledge Integration Tools
Suliman Al-Hawamdeh

Decision Tree Induction from Distributed Heterogeneous Autonomous Data Sources
Doina Caragea, Adrian Silvescu and Vasant Honavar

A Taxonomy of Data Mining Applications Supporting Software Reuse
S. Tangsripairoj and M. H. Samadzadeh

Lunch: 01:00 PM – 02: 30 PM

Tuesday, August 12, 2:30 PM – 03:30 PM (Plenary Session – 1V)

Speaker: Antony Satyadas, IBM, USA
Session Chair: Yasuhiko Dote, Muroran Institute of Technology, Japan

Tea Break: 03:30 PM – 04: 00 PM

Panel Discussion 1 (Room A): Tuesday, August 12, 04:00 AM – 05:00 PM

Knowledge Portal Technologies
Chair: Suliman Hawamdeh, Nanyang Technological University, Singapore

The main differences between Web Portals and Knowledge Portals are said to be in the types of technologies deployed on the portal and the types of interaction and collaboration created on the Web site. Technologies that are normally used includes knowledge discovery tools such as data mining, text mining, mind mapping, intelligent agent and intelligent information systems. Knowledge portals are designed to promote knowledge transfer, facilitate interaction and decision-making. The panel/forum will discuss the role of the intelligent agents in promoting Communication, collaboration, and interaction in the knowledge portal environment. How intelligent agents can be used to keep people connected and facilitate interaction.

Panel Discussion 2 (Room B): Tuesday, August 12, 04:00 AM – 05:00 PM

Soft Grid Computing: Gaps and Opportunities
Chair: Antony Satyadas, IBM, USA

Conference Banquette: August 12, 06:30 PM – 08: 30 PM. Held at Adam's Mark hotel, 100 East 2nd Street, Tulsa, OK 74103.
http://www.adamsmark.com/tulsa/pdf/rack.pdf

Tuesday, August 12, 2003

Wednesday, August 13, 9:00 AM – 10:00 AM (Plenary Session – V)

Speaker: Sugata Sanyal, Tata Institute of Fundamental Research, India
Session Chair: Sandip Sen, University of Tulsa, USA

Tea Break: 10:00 PM – 10: 30 AM

Parallel Technical Sessions: Wednesday, August 13, 10:30 AM – 01:00 PM

Session 3.1 (Room A): 2003 International Workshop on Intelligence, Soft computing and the Web
Workshop Organizers: Damminda Alahakoon and Shyue-Liang Wang

Enhanced Cluster Visualization Using the Data Skeleton Model
R. Amarasiri, L. K. Wickramasinghe and D. Alahakoon

Generating Concept Hierarchies for Categorical Attributes
Been-Chian Chien and Su-Yu Liao

Learning from Hierarchical Attribute Values
Tzung-Pei Hong, Chun-E Lin, Jiann-Horng Lin and Shyue-Liang Wang

Delivering Distributed Data Mining E-Services
Shonali Krishnaswamy

Maintenance of Discovered Functional Dependencies: Incremental Deletion
Shyue-Liang Wang, Wen-Chieh Tsou, Jiann-Horng Lin and Tzung-Pei Hong

Filtering Multilingual Web Content Using Fuzzy Logic
Rowena Chau and Chung-Hsing Yeh

A Comparison of Patient Classification Using Data Mining in Acute Health Care
Eu-Gene Siew, Kate A. Smith, Leonid Churilov and Jeff Wassertheil

Session 3.2 (Room B): Peer-to-Peer Computing
Chair (s): Prithviraj Dasgupta and Vana Kalogeraki

A Peer to Peer System Architecture for Multi-Agent Collaboration
Prithviraj Dasgupta

A Soft Real Time Agent Based Peer-to-Peer Architecture
Feng Chen and Vana Kalogeraki

Social Networks as a Coordination Technique for Multi-Robot Systems
Daniel Rodic and Andries P. Engelbrecht

Biology-Inspired Approaches to Peer to Peer Computing in BISON
Alberto Montresor Ozalp Babaoglu

UbAgent: A Mobile Agent Middleware Infrastructure for Ubiquitous Pervasive Computing
George Samaras and Paraskevas Evripidou

Session 3.3 (Room B) Data mining, Knowledge Management and Information Analysis
Chair: Sugatha Sanyal

Data Mining Techniques in Materialised Projection View
Ying Wah Teh and Abu Bakar Zaitun

Data Mining Techniques in Index Techniques
Ying Wah Teh and Abu Bakar Zaitun

Lunch: 01:00 PM – 02: 30 PM

Wednesday, August 13, 2:30 PM – 03:30 PM (Plenary Session –VI)

Intelligent Agent Technologies for User Support and Peer-to-Peer Computing

Speaker: Sandip Sen, University of Tulsa, USA
Session Chair: Sugata Sanyal, Tata Institute of Fundamental Research, India

Tea Break: 03:30 PM – 04: 00 PM

Parallel Technical Sessions: Wednesday, August 1 3, 04:00 PM – 06:00 PM

Session 3.3 (Room A): 2003 International Workshop on Intelligence, Soft computing and the Web
Workshop Organizers: Damminda Alahakoon and Shyue-Liang Wang

Criteria for a Comparative Study of Visualization Techniques in Data Mining
Robert Redpath and Bala Srinivasan

Controlling the Spread of Dynamic Self Organising Maps
Damminda Alahakoon

Session 3.4 (Room A) Image Processing and Retrieval
Chair: Phillip A. Mlsna

Image Database Query Using Shape-Based Boundary Descriptors
Nikolay M. Sirakov, Jim Swift and Phillip A. Mlsna

Image Retrieval by Auto Weight Regulation PCA Algorithm
W. H. Chang and M. C. Cheng

Improving the Initial Image Retrieval Set by Inter-Query Learning with One-Class SVMs
Iker Gondra, Douglas R. Heisterkamp and Jing Peng

Tongue Image Analysis Software
Dipti Prasad Mukherjee and D. Dutta Majumder

2 D Object Recognition Using the Hough Transform
Venu Madhav Gummadi and Thompson Sarkodie-Gyan

Session 3.5 (Room B): Optimization, Scheduling and Heuristics
Chair: Johnson P. Thomas

Adjusting Population Size of Differential Evolution Algorithm using Fuzzy Logic
Junhong Liu and Jouni Lampinen

Intelligent Management of QoS Requirements for Perceptual Benefit
George Ghinea, George D.Magoulas and J. P. Thomas

Integrating Random Ordering into Multi-heuristic List Scheduling Genetic Algorithm
Andy Auyeung, Iker Gondra and H. K. Dai

Scheduling to be Competitive in Supply Chains
Sabyasachi Saha and Sandip Sen

Contract Net Protocol for Cooperative Optimisation and Dynamic Scheduling of Steel Production
D. Ouelhadj, P. I. Cowling and S. Petrovic

ISDA'03: Conference Registration (non-authors)

Contact Information

Title:

First name(s)*:

Last name(s)*:

Affiliation/Institution*:

E-mail*:

Address

City: **State/Province/Region Code:** **Zip/Postal Country**

Phone: **Fax**

Conference Registration

Current IEEE-SMC membership is required to receive the member registration rates. Students, please fax a copy of your valid student ID and a letter from your advisor or suitable official indicating your student status to +1 (405) 744-6992 . We appreciate your cooperation.

Rate type*: Member/Non-Member: _____

Member/Student ID Number: _____

The registration fee includes all technical sessions, coffee breaks, welcome reception on Sunday, August 10, 2003, and Banquet on Tuesday, August 12, 2003.

Registration fees*	
Non-member:	$ 300
Member of the IEEE or IEE:	$ 250
Student with valid identification:	$ 200

** Registration will not include a copy of the proceedings*

Tutorial Registration

Tutorials will be held on August 10, 2003. The number of seats allocated for the included tutorials is limited, so be sure to indicate the tutorial of your choice. These will be allocated on a first come, first serve basis. Each tutorial will be charged US$40.00 (US$25 for students). A second tutorial can be added for an additional fee of $ 30.00 , and $20.00 for students.

Select	Tutorial Title
	Sunday, August 10, 9:00 am-12:30 pm
☐	T1 Automatic Recognition of Natural Speech
☐	T2 Geometric Graphs for Instance-Based Learning
☐	T3 Analysis, Optimization, and Verification of Real-Time Rule-Based Systems
	Sunday, August 10, 2:00 pm - 5:30 pm
☐	T4 Tutorial on Knowledge Commerce
☐	T5 Design, Development and Implementation of Question Answering Systems
☐	T6 Intelligent Information Security Systems

Additional banquet tickets may be purchased for $30.00 each.

Number of additional banquet tickets:

If you would like to request a vegetarian meal for the banquet please check the following box: ☐

Registration:

	Amount
Special registration - US $ 300.00, (IEEE SMC Members - US$250.00, Students: US $200.00)	$_____
Tutorials (US $40.00, Students: US $25.00)	$_____
Additional Guest Banquet Tickets: $ 30.00 x ____	$_____
Total :	$_____

[ ] Card name: VISA/Master Card/AMEX

Card number:_____ _____ Expiry Date:_____Signature _____

[ ] Welcome reception, Aug 10, 2003 6:30 p.m. : I will attend / will not attend
[ ] Banquet, Aug 12, 2003 6:30 p.m. : I will Attend / will not Attend

Please send the completed forms to:

Ms. Marsha Flasch, Arts and Sciences Extension, Oklahoma State University, Stillwater, Oklahoma 74078-3017, USA. Phone: (405) 744-5647, Fax: (405) 744-6992