Robert Marks
Baylor University, USA

2006 CIS Neural Networks Pioneer Award

Erkki Oja

Erkki Oja is Director of the Adaptive Informatics Research Centre and Professor of Computer Science at the Laboratory of Computer and Information Science, Helsinki University of Technology, Finland. He received his Dr.Sc. degree in 1977. He has been research associate at Brown University, Providence, RI, and visiting professor at Tokyo Institute of Technology. Dr. Oja is the author or coauthor of more than 280 articles and book chapters on pattern recognition, computer vision, and neural computing, and three books: "Subspace Methods of Pattern Recognition" (RSP and J.Wiley, 1983), which has been translated into Chinese and Japanese, "Kohonen Maps" (Elsevier, 1999), and "Independent Component Analysis" (J. Wiley, 2001). In the first book, he presented his theory of Hebbian learning rules for on-line Pricipal Component Analysis—the so-called Oja rule—which became an influential model in unsupervised learning neural networks. Dr. Oja's research interests are in the study of principal component and independent component analysis, self-organization, statistical pattern recognition, and applying artificial neural networks to computer vision and signal processing. Dr. Oja is member of the editorial boards of several journals and has been in the program committees of several recent conferences including ICANN, IJCNN, and ICONIP. He is member of the Finnish Academy of Sciences, Founding Fellow of the International Association of Pattern Recognition (IAPR) and recipient of the P. Devijver Award, Governing Board member of the INNS and past president of the European Neural Network Society (ENNS).

Donald Specht

Donald F. Specht is a Principal Research Scientist at the Lockheed Martin Advanced Technology Center at Palo Alto, California. He received his Ph.D. in Electrical Engineering from Stanford University; his dissertation was one of the first in neural networks. His pioneering work in the field of neural networks has resulted in two important applications in medicine, several applications in aerospace, and the development of two neural network paradigms, PNN and GRNN, which are widely used throughout the world. One of the first applications of neural networks in medicine was computer analysis of electrocardiograms (using both Madaline and the polynomial discriminant method). Later Dr. Specht co-founded R2 Technology, a company dedicated to using neural networks for the detection of cancer in mammograms and other medical imaging modalities. From 1970–1984 he developed products for digital subtraction angiography, longitudinal tomography, and cardiac ultrasound. During this period he served on the editorial board of the Journal of Cardiovascular Ultrasonography. At Lockheed Martin he has been involved in neural networks research, hardware design, and various aerospace applications including hyperspectral imaging and adaptive optics. In 1993 he received Lockheed's Robert E. Gross Award for Technical Excellence. At KLA-Tencor he developed a series of high speed defect detection machines for photo masks and reticules. These were the first sub-pixel defect detection machines in the semiconductor industry. Dr. Specht has published numerous papers on neural networks, automated diagnosis, ultrasonic imaging, medical X-ray, tomography, and data compression. He has been granted seven U.S. patents. He served as an Associate Editor of the IEEE Transactions on Neural Networks during its founding and its first three years of publication.

2006 CIS Fuzzy Systems Pioneer Award

Janusz Kacprzyk

Janusz Kacprzyk is a Professor of Computer Science at the Systems Research Institute, Polish Academy of Sciences in Warsaw Poland, and Deputy Director for Research in this Institute. He received M.S. in computer Science and automatic control from the Warsaw University of Technology, Ph.D. in systems analysis and D.Sc. (habilitation) in computer science from the Polish Academy of Sciences, and the title of Professor from the President of the Republic of Poland in 1997. Since 2002 he is an Academician (Member of the Polish Academy of Sciences). He has been with the Systems Research Institute, Polish Academy of Sciences since 1970, and he has spent some years as a visiting professor at University of North Carolina, University of Tennessee, Iona College, University of Trento, Italy, and Nottingham Trent University, England. His research interests include soft computing, fuzzy logic and computing with words, in decisions and optimization, control, database querying, information retrieval, etc. He is the author of 5 books, author and coauthor of more than 300 papers, coeditor of more than 30 edited volumes. His book "Multistage fuzzy control," Wiley, Chichester, 1997 is a fundamental reference on fuzzy dynamic programming, multistage fuzzy control, etc.

Curently his main research interest is in the use of soft computing in decision support systems. He had been a Vice-President of IFSA in 1991–1995, the Treasurer of IFSA in 2001–2005, and in 2005 was elected the President-Elect of IFSA. He is a Fellow of IEEE and IFSA. Professor Kacprzyk has received numerous national and international awards, in particular the 2005 IEEE CIS Pioneer Award for seminal works on multistage fuzzy control, notably fuzzy dynamic programming. He is the editor in chief of three Springer's book series: "Studies in Fuzziness and Soft Computing," "Advances in Soft Computing," "Studies in Computational Intelligence", serves on editorial boards of about 25 international journals, notably is an Associate Editor of IEEE Transactions on Fuzzy Systems. He has been a member of the International Program committees of more than 200 national and international conferences, symposia, workshops and congresses.

2006 CIS Meritorious Services Award

Evangelia Micheli-Tzanakou

Evangelia Micheli-Tzanakou is Professor II and Director of the Computational Intelligence Laboratories in the Department of Biomedical Engineering at Rutgers and an adjunct professor of the University of Medicine and Dentistry of New Jersey. Dr. Tzanakou was Chair of the BME Department for 10 years and established the Undergraduate curriculum in the same. She is a Founding Fellow of AIMBE, a Fellow of IEEE and a Fellow of the New Jersey Academy of Medicine. She has published two books: "Supervised and Unsupervised Pattern Recognition: Feature Extraction and Computational Intelligence" was published by CRC Press in January 2000 and co-authored a book with S. Deutsch on "Neuroelectric Systems," published by New York University Press, in 1987. She has published over 250 scientific papers in journals, conference proceedings and book chapters. She has also edited several books and conference proceedings. Dr. Tzanakou has established the first ever experimental Brain to Computer Interface (BCI), using the ALOPEX algorithm, in 1974. This method is now used for target optimization in Parkinson's disease. ALOPEX has also been used in a wide variety of problems: signal processing, image processing, pattern recognition, transportation and many more. Dr. Tzanakou is Book Series Editor in Biomedical Engineering for Springer Publishing; Associate Editor for the IEEE Transactions on Neural Networks; on the editorial board of the IEEE Transactions on Information Technology; editorial board of the IEEE Transactions on Nano-bio-sciences, and the editorial board of the new journal "Biomedical Engineering on-line." She has served as Vice President for Conferences of the IEEE Neural Networks Council. She was the 2003 President of the Neural Networks Society; Chair of the IEEE Awards Board in 2003 and 2004. Currently she is IEEE Director, Division X for 2005 and 2006. Dr. Tzanakou has received several awards including: an Outstanding Advisor Award in 1985 from IEEE, in 1992 the Achievement Award of the Society of Women Engineers, in 1995 she was awarded the NJ Women of Achievement Award for the application of neural networks to engineering in medicine and biology. She is the recipient of the IEEE CIS Meritorious Service Award for 2006. Her research interests include Neural Networks, Information Processing in the brain, Image and Signal Processing applied to Biomedicine, Mammography, Telemedicine, Hearing Aids and electronic equivalents of neurons. She has graduated over 40 Masters and Ph.Ds and currently supervises a number of graduate and undergraduate students.

2006 CIS Neural Networks Outstanding Paper Award

Juwei Lu, Konstantinos N. Plataniotis, and Anastasios N. Venetsanopoulos, "Face Recognition Using Kernel Direct Discriminant Analysis Algorithms," IEEE Transactions on Neural Networks, Vol. 14, No. 1, pp. 117–126, January 2003.

Abstract: Techniques that can introduce low-dimensional feature representation with enhanced discriminatory power is of paramount importance in face recognition (FR) systems. It is well known that the distribution of face images, under a perceivable variation in viewpoint, illumination or facial expression, is highly nonlinear and complex. It is, therefore, not surprising that linear techniques, such as those based on principle component analysis (PCA) or linear discriminant analysis (LDA), cannot provide reliable and robust solutions to those FR problems with complex face variations. In this paper, we propose a kernel machine-based discriminant analysis method, which deals with the nonlinearity of the face patterns' distribution. The proposed method also effectively solves the so-called "small sample size" (SSS) problem, which exists in most FR tasks. The new algorithm has been tested, in terms of classification error rate performance, on the multiview UMIST face database. Results indicate that the proposed methodology is able to achieve excellent performance with only a very small set of features being used, and its error rate is approximately 34% and 48% of those of two other commonly used kernel FR approaches, the kernel-PCA (KPCA) and the generalized discriminant analysis (GDA), respectively.

2006 CIS Fuzzy Systems Outstanding Paper Award

"'Fuzzy' Versus 'Non-Fuzzy' in Combining Classifiers Designed by Boosting," IEEE Transactions on Fuzzy Systems, Vol. 11, No. 6, pp. 729–741, December 2003.

Abstract: Boosting is recognized as one of the most successful techniques for generating classifier ensembles. Typically, the classifier outputs are combined by the weighted majority vote. The purpose of this study is to demonstrate the advantages of some fuzzy combination methods for ensembles of classifiers designed by Boosting. We ran two-fold cross-validation experiments on six benchmark data sets to compare the fuzzy and nonfuzzy combination methods. On the "fuzzy side" we used the fuzzy integral and the decision templates with different similarity measures. On the "nonfuzzy side" we tried the weighted majority vote as well as simple combiners such as the majority vote, minimum, maximum, average, product, and the Naive-Bayes combination. In our experiments, the fuzzy combination methods performed consistently better than the nonfuzzy methods. The weighted majority vote showed a stable performance, though slightly inferior to the performance of the fuzzy combiners.

2006 CIS Evolutionary Computation Paper Award

Joshua Knowles and David Corne, "Properties of an Adaptive Archiving Algorithm for Storing Nondominated Vectors," IEEE Transactions on Evolutionary Computation, Vol. 7, No. 2, pp. 100–116, April 2003.

Abstract: Search algorithms for Pareto optimization are designed to obtain multiple solutions, each offering a different trade-off of the problem objectives. To make the different solutions available at the end of an algorithm run, procedures are needed for storing them, one by one, as they are found. In a simple case, this may be achieved by placing each point that is found into an "archive" which maintains only nondominated points and discards all others. However, even a set of mutually nondominated points is potentially very large, necessitating a bound on the archive's capacity. But with such a bound in place, it is no longer obvious which points should be maintained and which discarded; we would like the archive to maintain a representative and well-distributed subset of the points generated by the search algorithm, and also that this set converges. To achieve these objectives, we propose

an adaptive archiving algorithm, suitable for use with any Pareto optimization algorithm, which has various useful properties as follows. It maintains an archive of bounded size, encourages an even distribution of points across the Pareto front, is computationally efficient, and we are able to prove a form of convergence. The method proposed here maintains evenness, efficiency, and cardinality, and provably converges under certain conditions but not all. Finally, the notions underlying our convergence proofs support a new way to rigorously define what is meant by "good spread of points" across a Pareto front, in the context of grid-based archiving schemes. This leads to proofs and conjectures applicable to archive sizing and grid sizing in any Pareto optimization algorithm maintaining a grid-based archive.

List of Neural Networks Pioneer Awardees—
2006, Donald Specht and Erkki Oja
2005, Carver Mead
2004, Andrew Barto
2003, Kunihiko Fukushima
2002, Terrence Sejnowski
2001, David E. Rumelhart and James L. McCelland
2000, Leon Chua
1999, Robert Hecht-Nielsen
1998, Geoffrey E. Hinton
1997, John J. Hopfield
1995, Michael A. Arbib, Nils J. Nilsson and Paul J. Werbos
1994, Christoph von der Malsburg
1993, Thomas M. Cover
1992, Shun-Ichi Amari, Walter Freeman
1991, Bernard Widrow, Stephen Grossberg, Teuvo Kohonen

List of Fuzzy Systems Pioneer Awardees—
2006, Janusz Kacprzyk
2005, Enric Trillas
2004, Ronald Yager
2003, Ebrahim Mamdani
2002, Didier Dubois and Henri Prade
2001, James Bezdek
2000, Lotfi Zadeh and Michio Sugeno

List of Evolutionary Computation Awardees—
2005, Kenneth De Jong
2004, Richard Friedberg
2003, John H. Holland
2002, Ingo Rechenberg and Hans-Paul Schwefel
2001, Michael Conrad
2000, George E.P. Box
1999, Alex S. Fraser
1998, Lawrence J. Fogel

List of Meritorious Services Awardees-
2006, Evangelia Micheli-Tzanakou
2005, Piero P. Bonissone
2004, Enrique Rusipini

Piero P. Bonissone
General Electric Global Research, USA

Fellows

IEEE Fellows—Class of 2006

Andrew Barto

Andrew Barto is Professor of Computer Science, University of Massachusetts, Amherst. He received his B.S. with distinction in mathematics from the University of Michigan in 1970, and his Ph.D. in Computer Science in 1975, also from the University of Michigan. He joined the Computer Science Department of the University of Massachusetts Amherst in 1977 as a Postdoctoral Research Associate, became an Associate Professor in 1982, and has been a Full Professor since 1991. He is Co-Director of the Autonomous Learning Laboratory and a core faculty member of the Neuroscience and Behavior Program of the University of Massachusetts. His research centers on learning in natural and artificial systems, and he has studied machine learning algorithms since 1977, contributing to the development of the computational theory and practice of reinforcement learning. His current research centers on models of motor learning and reinforcement learning methods for real-time planning and control, with specific interest in autonomous mental development through intrinsically motivated reinforcement learning. He currently serves as an associate editor of Neural Computation, as a member of the editorial boards of the Journal of Machine Learning Research, Adaptive Behavior, and Theoretical Computer Science-C: Natural Computing. Professor Barto is a Fellow of the American Association for the Advancement of Science, a Fellow and Senior Member of the IEEE, and a member of the American Association for Artificial Intelligence and the Society for Neuroscience. He received the 2004 IEEE Neural Network Society Pioneer Award for contributions to the field of reinforcement learning. He has published over one hundred papers or chapters in journals, books, and conference and workshop proceedings. He is co-author with Richard Sutton of the book "Reinforcement Learning: An Introduction," MIT Press 1998, and