Proceedings

HIS'04
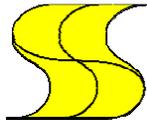
Fourth International Conference on Hybrid Intelligent Systems

5-8 December 2004
Kitakyushu, Japan

In Cooperation with
IEEE

Computational intelligence Society
Home of Neural Networks, Fuzzy Systems and Evolutionary Computation

Technical Sponsors

SYSTEMS, MAN, AND CYBERNETICS SOCIETY ◆IEEE

.... B

HIS'04 is supported by the City of Kitakyushu

Where the Past Meets the Future
Kitakyushu

IEEE Φ
COMPUTER
SOCIETY

◆IEEE

Los Alamitos, California
Washington   •   Brussels   •   Tokyo

IEEE Computer Society
Conference Publishing Services
http://www.computer.org/proceedings/

General Chairs Welcome Message

We are very pleased to once again welcome our colleagues to the Fourth International Conference on Hybrid Intelligent Systems (HIS'04) at the Kitakyushu International Conference Center, Kitakyushu, Japan. The HIS series of conferences attracts a wide range of interests with the development of the next generation of intelligent systems and its various practical applications. A fundamental stimulus to the investigation of hybrid intelligent systems is the awareness in the academic communities that combined approaches will be necessary if the real challenges in artificial intelligence are to be solved. Current research interests in this field focus on integration of the different computing paradigms such as fuzzy logic, neurocomputation, evolutionary computation, probabilistic computing, intelligent agents, machine learning, and other intelligent computing frameworks. The phenomenal growth of hybrid intelligent systems and related topics has created the need for this International conference as a venue to present the latest research. HIS'04 builds on the success of last year's. HIS'03, which was held in Melbourne, Australia, 14-17, December 2003 and attracted participants from over 32 countries. As evident from the general philosophy of HIS conferences, we have a focus on interdisciplinary approaches and the global strategy to bring together research scientists from the various disciplines related to hybrid intelligent systems. HIS'04, the Fourth International Conference on Hybrid Intelligent Systems, in Kitakyushu, Japan, December 05-08, 2004, addresses the following important themes:

* Theoretical advances in hybrid intelligent system architectures
  - Interactions between neural networks and fuzzy inference systems
  - Hybrid learning techniques (supervised/unsupervised/reinforcement learning)
  - Artificial neural network optimization using global optimization techniques
  - Fuzzy inference system optimization using global optimization algorithms
  - Hybrid systems involving support vector machines, rough sets, Bayesian networks, probabilistic reasoning, minimum message length, etc.
  - Hybrid computing using neural networks - fuzzy systems - evolutionary algorithms
  - Hybrid optimization techniques (evolutionary algorithms, simulated annealing, tabu search etc.)
  - Hybrid of soft computing and statistical learning techniques
  - Integration with Intelligent agents (architectures, environments, adaptation/learning and knowledge management)
  - Hybrid models using inductive logic programming, logic synthesis, grammatical inference, case-based reasoning etc.

* Hybrid approaches and applications
  - Biomimetic applications
  - Bioinformatics
  - Robotics and automation
  - Web intelligence
  - Image and signal processing
  - Data mining

- Behavioral simulations
- Affective computing
- Control and automation
- Multi-agent systems
- Knowledge management
- Communication and networking
- Business systems and financial engineering
- Power engineering

HIS'04 is technically co-sponsored by IEEE Systems Man and Cybernetics Society, International Fuzzy Systems Association, The World Federation on Soft Computing, Japan Society for Fuzzy Theory and intelligent informatics (SOFT), Biomedical Fuzzy Systems Association (BMFSA, Japan) and is organized in cooperation with the IEEE Computational Intelligence Society. HIS'04 is supported by the City of Kitakyushu, Japan and is co-hosted by the Riken Brain Science Institute, Tokyo, Japan and Kyushu Institute of Technology, Japan.

The HIS'04 program committee represented 22 countries on 5 continents and authors submitted papers from 26 countries on 6 continents. This certainly attests to the widespread, international importance of the theme of the conference. Each paper was peer reviewed by at least three or more program committee members and based on the recommendations of the reviewers, 69 regular papers and 15 poster papers were included in the final Programme. We would like to thank the HIS'04 international program committee and the additional reviewers for providing the reviews in time. Our special thanks also go to all the plenary speakers for providing the very interesting and informed talks to catalyze subsequent discussions.

Our special thanks to Ms. Jeniferdawn Cantarella of IEEE Computer Society Press for all the support and help related to the production of this important scientific work. Finally, we would like to express our sincere gratitude to all the authors and local organizing committees that have contributed towards the success of this conference. We look forward to seeing you in Kitakyushu, Japan during HIS'04, December 05-08, 2004.

November 30, 2004   Mario Köppen, *Fraunhofer IPK, Berlin, Germany*
                                          David Corne, *University of Exeter, UK*
                                          Ajith Abraham, *Chung-Ang University, Seoul, Korea*

                                          HIS'04 General Chairs

Program Chairs Welcome Message

Welcome to Kitakyushu, Japan!

The Fourth International Conference on Hybrid Intelligent Systems, HIS'04, has evolved out of a series of successful HIS conferences, the last one being held in Melbourne, Australia. The objectives of this international meeting are to increase the awareness of the research area with a broad spectrum of hybrid techniques, to bring together AI researchers from around the world to present their cutting-edge research results, to discuss the current issues in HIS research, to get a perspective view on future developments, to foster international collaboration, and as a result to further advance the state of the art of the field.

HIS'04 solicited papers on 1). Theoretical Advances in Hybrid Intelligent System Architectures and 2). Hybrid Approaches and Applications in various fields. Reflecting a surge of interest in this field, about 180 papers was submitted and from these 80 high-quality papers are selected for presentation by competent reviewers. HIS'04 also provides three Organized Technical Sessions proposed by distinguished researchers in each field. It is our great pleasure to have Dr. Una May O'Reilly, Prof. Witold Pedrycz, Prof. Toshio Fukuda, Prof. Nikola Kasabov and Prof. Sung-Bae Cho as plenary speakers at the Conference.

We would like to express our sincere gratitude to all the authors for submission, and to the members of the program committee for their careful and prompt reviews. We would also like to thank all the members of the International and Local Committees and co-sponsoring societies. All their efforts were indispensable to make HIS'04 possible. We would also express our gratitude to City of Kitakyushu for the valuable supports.

Finally, we would like to thank all the participants of HIS'04. Let's get together to talk about the cutting-edge topics of HIS and enjoy!

November 29, 2004   Shuji Hashimoto, *Waseda University, Japan*
                           Masumi Ishikawa, *Kyushu Institute of Technology, Japan*

                           HIS'04 Program Chairs