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Introducing the CIS Technical Activities

he technical activities of the IEEE Computational Intelligence Society (CIS) cover a broad spectrum of technologies and methodologies in computational intelligence (CI) and the related applications. CI aims to understanding nature and how its approaches can be effectively used to solve problems. The technical activities include promotion of scientific research, technological development, exploitation in applications, and dissemination of knowledge in the areas of CI.

In the CIS there are 11 Technical Committees (TCs), which can be grouped into three categories: (i) technology-oriented TCs promote CI technologies; (ii) application-oriented TCs deal with applications of CI technologies, and (iii) incubator TCs identify and nurture new CI technologies and new areas for CI applications. In addition, there are the Standards Committee, dealing with standards and data sets of interest to people working in the CI areas, and the Technology Transfer Committee, promoting transfers of CI technologies to the industry. The chairs of these committees form the CIS Technical Activities Committee, chaired by the Vice President for Technical Activities. The main purpose of these Committees is to provide a home for technical activities. Specific responsibilities of the TCs include fostering the scientific and technological development in their specific area, proposing conferences and workshops, organizing invited sessions for existing conferences, editing special issues in

the transactions and the CI Magazine, and cooperating in nomination of awards candidates. Each TC may establish a number of Task Forces (TFs) in specialized focuses within its own area of interest.

For more information about the TCs, their structure, their operation and their activities, please visit the CIS web site at http://ieee-cis.org. In future issues of this magazine the TCs will briefly present the hottest research areas, the main achievements, the most attractive outcomes, and the future directions of research and applications.

Technology-Oriented Technical Committees

The Neural Networks Technical Committee (NNTC) promotes the research, development, education, and understanding of neural networks, including both artificial and biologically plausible neural networks.

The International Joint Conference on Neural Networks (IJCNN) originated from the NNTC and attracts a growing number of submissions in recent years (e.g., 825 in 2004, 750 in 2005, and 1143 in 2006).

Presently, the NNTC has the following TFs: Vision and Image Processing, Adaptive Systems, Neural Hardware, Neuroinformatics, Speech and Audio Processing, Support Vector Machines, Neural Dynamics, Hybrid Intelligent Systems, and Computational Neuroscience. The NNTC Chair for 2006 is Ian Cloete (ian.cloete@i-u.de). The Fuzzy Systems Technical Committee (FSTC) deals with fuzzy systems technology, including the creation of fuzzy systems theory and models, development of new design procedures for fuzzy systems, computing with words, and applications of fuzzy technologies.

The IEEE International Conference on Fuzzy Systems (FUZZ-IEEE) originated from the FSTC; the submissions to FUZZ-IEEE 2006, a part of WCCI 2006, increased compared to the recent past. The FSTC also convenes the IEEE Symposium on Evolving Fuzzy Systems.

Recently, the FSTC has proposed 3 special issues for the IEEE Transactions on Fuzzy Systems (TFS) and maintains 2 websites, i.e., the Extension to Type-1 Fuzzy Sets Task Force www.cse.dmu. ac.uk/~rij/fstctf.html and Type-2 Fuzzy Logic: www.type2fuzzylogic.org

Current TFs within the FSTC include Extensions of Type-1 Fuzzy Sets, Applications, Interval Computations and Fuzzy Techniques, Genetic Fuzzy Systems, Fuzzy Logic Software, Future Directions in Fuzzy Sets and Systems, and Competitions. The FSTC Chair for 2006 is Jerry Mendel (jmmprof@ comcast.net).

The Evolutionary Computation Technical Committee (ECTC) focuses on computational techniques that use non-deterministic methods to adapt their behavior over time. These techniques are inspired by adaptive methods found in nature and solve problems by modeling evolutionary processes. The IEEE Congress on Evolutionary Computation (CEC) originated from the ECTC and enjoys a growing number of submissions and attendance. There are also several other conferences and symposia: Workshop on Multiobjective Robotics, IEEE/RSJ IROS 2006 in Beijing (China), 2007 IEEE Symposium on Computational Intelligence in Scheduling (CISched'07), the 1st IEEE Symposium on Computational Intelligence in Multicriteria Decision Making (MCDM'07), and the 2007 IEEE Swarm Intelligence Symposium (SIS'07).

One special issue in the IEEE Transactions on Evolutionary Computation (TEC) is to appear in August 2006, while one additional special issue proposal has been submitted to the TEC.

Currently the ECTC has the following Working Groups: Evolvable Hardware, Multi-Objective Evolutionary Algorithms, Artificial Immune Systems, Evolutionary Scheduling and Timetabling, Swarm Intelligence, Artificial Life and Complex Adaptive Systems, Coevolution, Evolutionary Computation in Dynamic and Uncertain Environments (ECiDUE), Future Directions of Evolutionary Computation, and Evolutionary Algorithms Based on Probabilistic Models. The ECTC Chair for 2006 is Ali M. S. Zalzala (zalzala@hikmagroup.com).

The Autonomous Mental Development Technical Committee (AMDTC) is interested in autonomous mental development technology, including the creation of biological autonomous mental development models and the applications of artificial mental-development systems that are partially or fully autonomous.

The AMDTC organizes the International Conference on Development and Learning (ICDL) since 2005. ICDL 2006 attracted 110 submissions. ICDL 2007 will be held in London, UK. The AMDTC organized special sessions in the 2006 World Congress on Computational Intelligence (WCCI 2006). The AMDTC edited a special issue in the Computational Intelligence Magazine, to appear later in 2006. There is also AMD-TC newsletter.

The AMDTC includes the following TFs: Speech and Auditory Processing, Visual Processing, Hapticand Motor Processing, Languages and Language Acquisition, Self-organization in Development, Adaptive Motivational Systems, Reasoning and Inference, Attention and Joint Attention, Emotion, Robotics, and AMD Newsletter. The AMDTC Chair for 2006 is Brian Scassellati (scaz@cs.yale.edu).

The Data Mining Technical Committee (DMTC) aims to: (1) promote the research, development, education and understanding of data mining principles and applications and (2) to help researchers whose background is primarily in computational intelligence in increasing their contributions to this area.

The DMTC is organizing the First IEEE Symposium on Computational Intelligence and Data Mining (CIDM 2007). A Yahoo discussion group has been established. The DMTC Chair for 2006 is Joydeep Ghosh (ghosh@ ece.utexas.edu).

The Granular Computing Technical Committee (GrCTC) was established in July 2006, in recognition of the relevance and solidity of this area. In fact there are rapidly growing research interests in GrC all over the world. Research in GrC is inherently inter-disciplinary and cuts across many areas, such as data engineering, fuzzy sets, rough sets, interval mathematics, theory of human, and machine learning..

The International Conference on Granular Computing (GrC) started in 2005 in Beijing (China), with more than 300 submissions. GrC 2006 was held in Atlanta and also attracted over 300 submissions. GrC 2007 and GrC 2008 are currently being planned. Several books on GrC have been published. The GrCTC Chair for 2006 is Witold Pedrycz (pedrycz@ece.ualberta.ca).

Application-Oriented Technical Committees

The Bioinformatics and Bioengineering Technical Committee (BBTC) promotes CI methods in the application areas of bioinformatics, bioengineering, and computational biology.

The BBTC organizes the Symposium on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB). The Symposia attracted 50 submissions in 2004 and over 100 in the subsequent years. CIBCB 2007 will be held in Honolulu. In addition, the BBTC has organized special sessions in CEC since 1999 and tutorials since 2003.

The BBTC has edited a special issue to appear in the IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB). Another special issue is coming up in IEEE Transactions on Nano BioScience. Two books will be published in IEEE Press. The BBTC is reaching out to biology/medical communities with an ambassador program.

Currently there are the following TFs in the BBTC: Quarterly newsletter, Resource web (software, announcements), Biomedical applications. The BBTC Chair for 2006 is Kay C. Wiese (wiese@cs.sfu.ca).

The Computational Finance and Economics Technical Committee (CFETC) handles computational finance and economics. Scope of computational finance and economics includes: the development of advanced computing techniques for financial and economic applications; through the application of advanced computing techniques, advance the subjects of finance and economic; to bring research in computational methods to real-world financial and economic applications.

Researchers in computational finance and computational economics are invited to join the Computational Finance and Economics Network (http:// et.evannai.inf.uc3m.es/cfetc-network/ index.asp) organized by the CFETC.

The CFETC organized a special session on Computational Finance and Computational Economics for CEC 2006 and is planning to organize a session for CEC 2007. The CFETC is planning to organize IEEE Conference on Financial Engineering in the near future. In addition, the CFETC is seeking to collaborate with other non-IEEE conferences and organizations. A special issue proposal submitted by the CFETC is under evaluation of the TEC. The CFETC Chair for 2006 is Pedro Isasi (isasi@ia.uc3m.es).

The *Games Technical Committee* (*GTC*) is another new technical committee established in July 2006, in recognition of the value and impact of this area for the theoretical aspects and the application outcomes. The main focus is on the study and application of the computational intelligence technologies in games, i.e., in the design and implementation of dynamically adaptive strategies suited to play effectively.

The GTC organizes the IEEE Symposium on Computational Intelligence and Games (CIG). CIG 2005 was held in the University of Essex, UK, with 62 delegates. The specific interest expanded in CIG 2006 and will grow further with CIG 2007. In addition, the GTC organized 3 special sessions on games in CEC'06 and 3 special sessions on games in CEC 2005.

The GTC organized various competitions, including a radio-controlled car racing for CEC 2005 and neural network Othello for CEC 2006. A special issue on evolutionary computation and games appeared in TEC in 2005. The GTC Chair for 2006 is Simon Lucas (sml@essex.ac.uk).

Incubator Technical Committees

The Emergent Technologies Technical Committee (ETTC) identifies, tracks, and promotes new and emergent approaches, concepts, and directions in fields related to the computation intelligence technologies early to ensure that the CIS can provide the best service in these areas as promptly as possible. The fast inauguration of TFs in emerging potentially relevant technologies is one of the main instruments the ETTC uses to fulfil its mission. The TFs are regarded as incubators for new TCs: for example, the new GrCTC grew out from a TF on GrC. Five special sessions have been organized within the ETTC for the World Congress on Computational Intelligence 2006.

Currently, the ETTC has following TFs: Cognition and Language, Computational Systems Biology, Intelligent Agents, Neurodynamics, Organic Computing, Quantum Computing, and Social Computing. The ETTC Chair for 2006 is Bernhard Sendhoff (Bernhard.Sendhoff@honda-ri.de).

The Intelligent Systems Applications Technical Committee (ISATC) aims: (1) to foster more effective transfer of computational intelligence technologies and higher levels of intelligence to large-scale applications important to humanity; (2) to foster greater feedback from the challenges encountered in these applications to the core research in computational intelligence; (3) to make it easier for researchers and corporations whose background is primarily in computational intelligence to increase their contributions in these areas; (4) to develop stronger two-way liaisons with other professional societies who support these goals, as well as with industry and governments.

There are the following TFs in the ISATC: Aerorspace applications, Alternative energies, Automotive applications, Biometrics, Esthetics, entertainment and education, Homeland security, Intelligent measuring systems, Intelligent transportation systems, Intelligent ubiquitous computing, Mechatronics, Power application, Software engineering, Speech and vision processing, Telecommunications, and Virtual reality.

The ISATC organizes the IEEE Conference on Computational Intelligence for Measurement Systems and Applications since 2003, and the IEEE Conference on Computational Intelligence for Homeland Security and Personal Safety since 2004. The ISATC also organized some special sessions in WCCI 2006 and is planning for the First IEEE International Conference on Medical Biometrics and the Symposium on Computational Intelligence in Esthetics, Entertainment and Education. The ISATC Chair for 2006 is David Zhang (csdzhang@comp.polyu.edu.hk).

Standards Committee

The Standards Committee (SC) is focusing on the identification of reference material and benchmarks for computational intelligence technologies and applications. The SC developed a website for collecting the references to many popular data sets that CIS professionals consider as data sets of choice for a variety of computational experiments (e.g., in optimization, prediction, classification, pattern recognition, computer vision, data mining, decision tree generation, control, linguistic rule extraction, decision support systems). The SC offers also reference documents with widely accepted terminology and background literature, e.g., one on type-2 fuzzy logic systems.

The SC also facilitates the comparisons of various approaches by competitions (contests). Recently two competitions were organized at WCCI 2006 and one at ICAISC 2006. The SC Chair for 2006 is Leszek Rutkowski (lrutko@kik.pcz.czest.pl).

Technology Transfer Committee (TTC)

The TTC promotes transfers of CI technologies from researchers in universities and industrial laboratories to industries, entrepreneurships, and governmental agencies as part of production processes, products or practical use in tools.

The TTC Chair for 2006 is Fahmida N. Chowdhury (fnchowdh@louisiana. edu; fchowdhu@nsf.gov).

Getting Involved

The IEEE Computational Intelligence Society depends on you to get involved and help. You can participate in the society's technical activities in many ways. Each TC holds a meeting during their annual conference, e.g., the NNTC, FSTC and ECTC regularly meet at its respective annual conference in IJCNN, FUZZ-IEEE, and CEC. (continued on page 17)

Family Corner

IEEE/CIS Tour de China

hina's burgeoning economy has led to a dramatic increase in manufacturing and trade between China and the western world. We have seen an increased participation at various conferences from Chinese authors, and graduate schools in Canada and the U.S. have seen an ever increasing number of applications from China during the last decade. However, membership in the IEEE Computational Intelligence Society from China is still low and our activities are not well known there. We believe that China's involvement in our international professional organization will greatly benefit its research, teaching and scholarship development. Therefore, to enhance the profile of the IEEE/CIS and to promote its activities as well as membership in the CIS, the society undertook a unique initiative by launching a "Tour de China" during May 9-17, 2006. The key organizer of this initiative was Gary G. Yen of Oklahoma State University. It is needless to say that it took him countless hours to make all detailed arrangements and make the event a genuine success.

This outreach connected the CI community in China to the top professional community, giving it further visibility and additional exposure to the outside world. For IEEE/CIS, it was an opportunity to focus on CIS membership in China, providing a clear view of how CIS will serve members' professional needs.

To promote the technical activities of the IEEE/CIS, an expert panel was assembled to present technical talks on



CIS Tour de China at South China University of Technology.



CIS Tour de China at Shanghai Jiao Tong University. From left: CIS volunteers: Jacek Zurada, Gary Yen, Witold Pedrycz, Vincenzo Piuri, Kay Wiese, Jim Keller and our host of Shanghai visit, Shao-Yuan Li, and Xin Yao.

Neural Networks (Jacek Zurada and Gary Yen), Fuzzy Systems (Jim Keller and Nikhil Pal), Evolutionary Computation (Xin Yao), Bioinformatics and Bioengineering (Kay Wiese) and Computational Intelligence Applications (Witold Pedrycz). In addition to the technical talks, Vincenzo Piuri (President of IEEE/CIS) opened each day of presentations with an overview of the IEEE/CIS and its mission and strategic planning.

In each of the four cities, a full day was devoted to presentations and meetings

increase the participation of researchers and students from China in the activities of IEEE/CIS.

We look forward to continued interaction with our friends in China.

Afterthoughts from Participating Volunteers...

Vincenzo Piuri: The "Tour de China" was a unique and highly valuable opportunity for the IEEE CIS to introduce itself to the Chinese scientific and professional communities: the main goal was to present its activities and expertise in order to identify issues of common interest and start working together. Understanding each others is the first step to create better and longlasting relationships. Understanding the knowledge, the expertise and the needs of the Chinese colleagues helped to shape the IEEE CIS activities to better serve the Chinese communities and to share competences in computational intelligence worldwide. The various meetings allowed us to meet many people, greet old friends, and make a number of new friends: upon friendship we will be able to build steady relationships for the benefit of all communities, for the advancement of science, technology and profession, and for the economical and social development and prosperity worldwide. These outcomes are already growing and will be visible starting from the next year.

Jacek Zurada: The Tour of China has provided the Chinese CIS professionals, mostly students and faculty, with a unique exposure to technical lectures and to personal interactions with a group of CIS volunteers/experts in their respective fields. By all accounts, we have been embraced by an overwhelming warm reception and the enthusiasm by our hosts. To keep this momentum going, we need to continue to reach into the Chinese (and other Far East) communities by inviting them to volunteer more often, to host and participate in our conferences, and by being part of our cadre of best CIS volunteers. Last but not least, most of the credit for launching the visit goes to Dr. Gary Yen, who, in addition to insping us to participate, unselfishly and very skillfully took care of planning and logistics.

Jim Keller: The tour de China offered an opportunity to the CIS volunteers to interact with a large number of Chinese researchers (faculty and students) who shared at some level our interests in computational intelligence. The depth and breadth of the questions that were asked impressed all of us. We were able to make the point that CIS is truly an international organization and is dedicated to expanding services around the world. Of course, a great added incentive was that we were able to experience some of the culture and cuisine of China.

Xin Yao: The visit to China represents the initiative and determination of the CIS in reaching out to (potential) Chinese members and getting them involved in IEEE. This is an important step towards making IEEE a truly representative international organization.

Witold Pedrycz: It was absolutely encouraging to see so much overwhelming enthusiasm and genuine interest in Computational Intelligence within the research communities we visited during this tour. The CIS has always been known for its innovative initiatives and forward thinking. This tour has sent a clear and strong message—now it is the right time to move forward and bring our activities to the Chinese research community.

Society Briefs (continued from page 14)

Technical committees are our grass-root organizations, only by getting actively involved can you help to shape your and our future.

For example, you may promote a research area or approach, organize special sessions in CIS-sponsored conferences, and propose a special issue in our journals. If there is clear evidence of the relevance and the interest about your topic, you can propose the creation of a TF and be selected to chair it; if the activities and the relevance of a TF become visible, outstanding and large, and the topic has an its own autonomy, the TF can be considered for possible promotion to a TC. At the beginning you can simply consider to cooperate proactively with the existing TCs, their TFs, and their technical activities.

Don't be shy! Your ideas, cooperation, comments, criticisms and suggestions will be highly valuable to the whole CIS. Let be involved in technical activities! Contact the appropriate TC Chair or me. We welcome you!