SS01	Practical applications of Agents and Multi-agent Systems J. Bajo, J.M. Corchado, Univ.Salamanca
SS02	Machine Learning and the future of medical care in 4P: personalised, predictive, preventive and participatory P. J.G. Lisboa, A. Vellido; UPC
SS03	Brain-Computer Interface: A multidisciplinary field F. Pelayo, R. Ron, M.A. Lopez; Univ.Granada
SS04	Advances in AI models adaptable to mobile devices M.A. Sanchez, M.E. Beato; Univ.Salamanca
SS05	Data Mining with Evolutionary Computation J. Dorado, J.R. Rabuñal; Univ.Coruña
SS06	(Social) Cognitive robotics C. Angulo; UPC
SS07	ForLing 2009:Non-Classical Formal Languages in Linguistics G. Bel-Enguix, M.D. Jimenez; URV - Reus
SS08	Applications of NN in bio-informatics and biomedical engineering H. Pomares, I. Rojas; Univ.Granada
SS09	Fuzzy Logic and Soft Computing Applications M. Ojeda, P. Cordero, Inma P. Cabrera; Univ.Malaga
SS10	New Algorithms for ANN High Impact Applications D. Andina; UPM
SS11	Graph based representations in Pattern Recognition and Computational Intelligence R. Marfil, F. Escolano; Univ.Malaga
SS12	Applying Evolutionary computation and Nature-inspired algorithms to Formal Methods I. Rodriguez; UCM
SS13	Modelling and data analysis in biomedical systems E. Garcia, M. Oltenau; Univ.Malaga
SS14	Evolutionary Approaches to multiobjective optimization and applications J.M. Molina, A. Berlanga; Univ. Carlos III (Madrid)
SS15	Aging well in the knowledge society (AKS) C. Urdiales; Univ.Malaga

SSO1
Practical applications of Agents and Multi-agent Systems

Special Session on Practical Applications of Agents and Multiagent Systems) will provide a unique opportunity to bring multi-disciplinary experts and practitioners together to exchange their experience in all aspects of Agents and Multi-Agent Systems, especially those concerned with applications. The session intends to bring together researchers and developers from industry and academic world to report on the latest scientific and technical advances on the application of multi-agent systems, discuss and debate the major issues, and showcase the latest systems using agent based technology. It is a multidisciplinary discipline that may attract scientist and professionals to IWANN and to provide a different field in which to apply ANN based technology. It will promote a forum for discussion on how agent-based techniques, methods, and tools help system designers to accomplish the mapping between available agent technology and application needs. Other stakeholders should be rewarded with a better understanding of the potential and challenges of the agent-oriented approach.

SSO2
Machine Learning and the future of medical care in 4P: personalized, predictive, preventive and participatory

Systems based on Machine Learning and Computational Intelligence techniques should have an important role in defining the methodologies for the next generation of healthcare delivery systems. This is expected to follow the 4P (personalized, predictive, preventive and participatory) agenda, which demands greater personalization to the needs of the individual patient, a focus on preventive medicine with the support of predictive approaches, as well as greater emphasis on pro-active involvement by the patient at the point of healthcare delivery. Such systems may need to combine information of different modalities and at multiple levels in a principled way, but they will also address radically new delivery mechanisms ranging from laboratories at the bedside, through care in the home, remote monitoring, intelligence alerts, to social networking using mobile phones.

The **main topics of interest**, any of them based on Computational Intelligence, Machine Learning and otherwise AI-related techniques, include (but are not necessarily limited to):

- Structured methodologies for multi-modal data (data fusion combining different modalities, e.g.: molecular biomarkers, histology, imaging, electrophysiological measurements and clinical signs).
- Methodologies for the analysis of functional and spectral signal and imaging data.
- Methodologies with a focus on model interpretation (including, for instance, visualization, feature selection and extraction, graphs, and rules).
- Survival analysis.
- Methodologies for computer-based medical decision support and treatment planning.
- Early studies of remote, mobile and non-standard healthcare systems.
- Current and planned clinical applications.

SSO3
Brain-computer Interface: A multi-disciplinary field

A BCI emerged few decades ago as a new communication procedure allowing subjects with severe neuromuscular disorders, who may be completely paralyzed or locked-in, to communicate and to interact with the outer world. However, recently BCI applications have been also used in totally different areas (e. g. entertainment). In the future, it is expected a qualitative improvement in performance, in terms of information transfer rate and reliability with potential uses in emerging areas, such as Ambient Assisted Living (AAL) or security. Thus, BCI progress depends on a multidisciplinary cooperation between neuroscientists, engineers, and psychologists.

The main goal of this special session is to show the last advances in the field of the BCI, such as signal processing algorithms, training techniques, neuroprosthetic devices or new applications.

Besides, we also propose a special demo session, where participants of the IWANN will be welcome to experiment with this technology by themselves.

SS04
Advances in AI models adaptable to mobile devices

Recent advances in mobile technology have supposed the need to develop new artificial intelligence models. These models must allow to automate certain tasks and to personalize the user attention. The specific characteristics of the mobile devices need new models for applications as games, guidance systems, communication systems …

The special session provides the opportunity for working together researchers, developers from industry and researchers of the academic world inside this so new field. IWANN is the appropriate frame for this type of activity because the IWANN objectives include the artificial intelligence and the artificial neuronal networks but, there not a specific field focused on contemplating their adaptation to these new and very common devices with very specific characteristics.

The topics proposed for the special session include the following, but they are not restricted to:

- Practical applications for Mobile devices.
- AI models for games in mobile devices.
- Guidance Models through mobile devices.
- Communication Systems and mobile identification.
- Education - learning systems adapted to mobile technologies.
- Decision support Systems for mobile environments.

SS05
Data Mining with Evolutionary Computation

Motivation

The different Evolutionary Computation (EC) techniques allow design, process optimization and knowledge extraction tasks. In the last years, EC is used more and more in data mining. The extraction of rules, information and knowledge from databases can be done with different EC tools, and with combinations of them with other IA techniques, resulting in hybrid systems.

Objectives:

- New advances in EC techniques
- Applications of knowledge extraction techniques
- Hybrid systems with different EC and AI techniques
- Real-world applications

SS06
(SOCIAL) COGNITIVE ROBOTICS

The Special Session on "(Social) Cognitive Robotics", in the framework of IWANN 2009 will provide a unique opportunity to bring multi-disciplinary experts and practitioners together to exchange their experience in all aspects of Social and Cognitive Robotics, especially those concerned with applications, methods, techniques and tools for perception, attention, anticipation or planning of internal 'mental' states. Autonomous systems are usually defined as systems capable of generating their own laws or norms. Cognitive robotics can be described as a research area devoted to endowing robots, a special case of autonomous system, with high-level cognitive capacities in order to complete complex tasks in complex environments. Social Robotics, on the other hand, is about the study of robots that are able to interact and communicate between themselves, with humans, and with the environment, within the social and cultural structure attached to its role.

Hence, social and cognitive robotics share common interests about designing computational tools and algorithms to achieve robot's behavior adaptation to its complex environment when situated in daily activities. Norms generated by the autonomous system must be adapted to social norms attached to its environment. Some norms for this environment can be determined from the activity daily life patterns of an user, needs for disabled people,...

The session intends to bring together researchers and developers from industry and academic world to report on the latest scientific and technical advances on the application of of Social and Cognitive Robotics, discuss and debate the major issues, and showcase the latest systems.

http://www.epsevg.upc.es/cecilio/iwann2009/iwann_socogrobotics.html

SS07
ForLing 2009:Non-Classical Formal Languages in Linguistics

The aim of this special session is to bring together researchers from different areas that have in common the use of formal language theory to approach different aspects of natural language processing.

Two editions of ForLing have already taken place. The first ForLing was hold in 2007, as a co-located workshop of the 16th International Symposium on Fundamentals of Computation Theory (FCT) that was hold in the Benczúr Hotel in Budapest (Hungary) on August 31, 2007 (see http:grammars.grlmc.com/ForLing2007). The second edition of the workshop, ForLing 2008, was organized by the Research Group on Mathematical Linguistics (GRLMC) of the Rovira i Virgili University (Tarragona) and was hold in Tarragona on September 19-20, 2008 (see http://grammars.grlmc.com/ForLing2008). Revised papers from ForLing 2007 are going to appear in a special issue of Fundamenta Informaticae. Selected and extended papers of ForLing 2008 will also be included in a well-ranked journal.

Topics of interest include (but are not limited to):

- Mathematical Linguistics
- Linguistic Applications of Formal Languages
- Formal Analysis of Linguistic Theories and Frameworks
- Model-Theoretic and Proof-Theoretic Methods in Linguistics
- Probabilistic and Statistical Models of Language
- Linguistic Applications of FSA
- Logics and Language

http://grammars.grlmc.com/Forling2009

SS08
Applications of NN in bio-informatics and biomedical engineering

For multi-disciplinary researcher, bioinformatics, the intersection of molecular biology and computer science, is a fascinating and challenging area in which to work, hybridizing different paradigms and technologies. Related with this topic, biomedical engineering applications is also a very interested field, in which theoretical advances and applications of information systems, artificial intelligence, signal processing, electronics and other engineering tools in knowledge areas related to biology and medicine have a big impact in the multi-disciplinary research community.
A large part of the information to support biological and biomedical research is available in an increasingly wide variety of rapidly-growing decentralized databases, and the use of advanced computing play an important role in this field. For example, the new so-called high-throughput measurement and sequence techniques have made possible genome-wide studies of gene function. The use of computer technology for storing DNA sequence information and constructing the correct DNA sequences from fragments identified by restriction enzymes was one of the first applications, arising

from the Human Genome Project, where intelligent systems and computer application has an important impact.

The aim of the special session is to bring together researchers, professionals, and industrial practitioners from all over the world for interaction and exchange of knowledge and ideas in all areas of bioinformatics, computational biology and biomedical engineering. Research, development or applications of advanced computational tools and approaches for expanding the use of biological, medical, behavioral or health data, including those to acquire, represent, describe, store, analyze or visualize such data are welcome in this session (NIH).

Topics: This special session is soliciting state-of-the-art research papers in the following areas of interest:

Bioinformatic

- Finding genes, locating coding regions, predicting function: automate
- Sequence, structure, function, evolution
- Bioinformatics for diseases
- Computational genomics and systems biology
- Data visualization and visual analytics
- Databases & Data Integration
- DNA assembly, clustering and mapping
- Errors and inconsistencies in biological databases
- Gene Expression/regulation & Microarrays
- Genomes and protein analysis
- High-performance bio-computing
- Integrative approaches for drug design
- Integrative data and text mining approaches
- Life sciences databases and ontologies
- Machine learning, data integration and data mining in the life sciences
- Molecular sequence analysis, modeling and simulation
- Parallel architectures and algorithms for biological applications
- Pathways, Networks, Systems Biology
- Prediction and integration of metabolic and regulatory networks
- Protein & RNA Structure and Function
- Protein-protein Interactions, prediction, and Molecular Networks
- Query processing and optimization for biological data
- Semantic web for the life sciences
- Structural and functional bioinformatics
- System Biology and Modeling
- Virtual cell modeling
- Other topics related to bioinformatic

Biomedical Engineering

- Biomedical imaging, image processing & visualization
- Rehabilitation engineering and clinical engineering
- Health monitoring systems and wearable system
- Bio-signal processing and analysis
- Biometric and bio-measurement
- Computational Bioengineering
- Computer-Integrated & Computer-Assisted Surgery
- Controlled Drug Delivery
- Mechanobiology

- Medical Robotics
- Micro Nano Biomedical devices & systems
- Neural and Advanced Systems Engineering
- Rehabilitation Engineering & Assistive Technology
- Pharmaceutical Sciences & Engineering
- Physiological System Modeling
- Regenerative Medicine & Tissue Engineering
- Telemedicine & Healthcare
- Bioelectrical and neural engineering
- Biomaterials and biomedical optics
- Biomedical devices, sensors, and artificial organs
- Biochemical, cellular, molecular and tissue engineering
- Biomedical robotics and mechanics
- Other topics related to biomedical engineering

SS09
Fuzzy Logic and Soft Computing Applications

Fuzzy logic and fuzzy methods have proved to be an important tool in the development of several real-world problems. The recent trends concerning Soft Computing or, more generally, Computational Intelligence, have fostered the integration of tools from different research lines (such as fuzzy logic, neural networks, evolutionary computing).

The aim of this special session is to bring researchers in the field of Mathematical Methods in Computational Intelligence, with a special focus on Fuzzy Logic and Soft Computing Applications, to exchange their ideas and approaches, to discuss and to present latest results on this field.

SS10
New Algorithms for ANN High Impact Applications

Session devoted to new algorithms in ANN applications that can have high impact results, either for the potential of the new algorithm (significant improvement on typical ANN advantages compared with other techniques) or for the impact of the application (health, environmental, industry, etc). It is a clear Multi-disciplinary, transversal and cutting-edge topic.

SS11
Graph based representations in Pattern Recognition and Computational Intelligence

Graph theory, which used to be a purely academic discipline, is now increasingly becoming an essential part in different areas of research. This special session will present new perspectives in graph-based representations applied in emerging fields,

such as computer vision, image processing, network analysis, web mining, 3D shape and graphics, chemistry, bioinformatics, robotics, sensor networks, biomedical engineering or evolutionary computation. Our goal is to provide a dedicated session that fosters closer interaction among researchers from different academic disciplines, providing a forum in which they can exchange their findings and ideas. From the perspective of the IWANN's program, this session complements the regular program with emerging topics related to the application of graph-based methods in computational intelligence.

SS12
Applying Evolutionary computation and Nature-inspired algorithms to Formal Methods

The community of Formal Methods (FM) has aimed for decades at constructing mathematically founded methods for analyzing the correctness of systems. These methods include model checking, formal testing techniques, verification, formal specification, etc. Though formal methods have been successfully applied to many industrial problems, these methods typically find the practical problem that the number of states to be systematically analyzed grows exponentially with the size of the system to be analyzed. Thus, exhaustive techniques to find system faults are typically substituted by heuristic strategies allowing to focalize the search for potential faults in some suspicious or critical configurations. Recently, some FM research groups have acknowledged the potential of Evolutionary Computation (EC) methods to provide the heuristics they require. In fact, EC methods provide efficient generic strategies to search for good solutions in big solution spaces, which fit into the kind of problems appearing in FM. The IWANN'09 special session on "Applying Evolutionary Computation and Nature-inspired Algorithms to Formal Methods" aims at providing a suitable meeting point for researchers working on applying EC to FM, giving them an opportunity to discuss their work from both the EC and the FM perspectives (not just one of them) in a cross-fertilization atmosphere.

The session welcomes works on the application of evolutionary computation and nature-inspired algorithms (genetic algorithms, ant colony optimization, particle swarm optimization, simulated annealing, neural networks, river formation dynamics, neural networks, etc) to formal methods (model checking, formal testing techniques, verification, formal specification, etc) and viceversa.
Selected papers from the special session will be considered for publication in a special number of an ISI-indexed journal (under negotiation).

SS13
Modelling and data analysis in biomedical systems

The analysis of biological data is a recurrent and challenging topic in statistics and machine learning. On one hand, during the last years, the development of new techniques for acquiring data (mass-spectrometry imaging, fast DNA sequencing,...) has provided huge amounts of data, demanding for adapted methods. On the other, modelling and identification of infectious diseases is an interesting computational subject both from a medical point of view (it can help to prevent diseases impact and to perform control and prevention task efficiently) and from a computational one (different estimation techniques may be applied and analized).

This session is devoted to presenting new algorithms and methodologies related to both research lines: data-analysis, in the context of complex biological data (epidemiologic, microarray, dna sequences, tissue images,...); and modelling and identification of biomedical system.

SS14
Evolutionary Approaches to multiobjective optimization and applications

The aim of this session is to bring together researchers working on the field of Multiobjective Optimization, with special emphasis on algorithm that hybridize artificial neural network. Pretend to be a meeting point to discuss current and future research and a place to exchange ideas for research in this field.

Topics include, but are not limited to:
Theoretical developments:
- Comparative studies of MOEAs
- New Algorithms for Multiobjective Optimization
- Test Data for Multiobjective Optimization Algorithms
- Performance Measures for Multiobjective Optimization Algorithms
- Hybrid MOEAs

Applications of MOEAs
- Image and Signal Processing
- Control and Automation
- Bioinformatics
- Data Mining
- Internet Modeling, Communication and Networking
- Decision Support Systems

SS15
Aging well in the knowledge society (AKS)

Among the aims of this workshop

- Provide a forum that addresses how aging and technology intersect
- Showcase innovative, emerging technologies
- Foster interdisciplinary exchanges among clinicians, biologists, engineers and other professionals

Papers covering all areas of disability and all areas of technology are encouraged. The special session will focus on a variety of topics that address the physical, cognitive, and emotional challenges of aging. Submitted papers and demos should address at least, but not only, one of the following issues:

- Ageing in place: smart living environments
- Stay connected: ICT for an ageing society
- Adaptive assistance for people with disabilities
- Cognitive support
- Ambient intelligence for assistive environments
- Service Robotics for eldercare
- Passive sensing for monitoring physical and/or cognitive condition
- Wearable sensors
- Aging assessment tools
- Rehabilitation systems
- Ethical considerations of eldercare systems
- Evaluating eldercare systems
- Ageing biomechanics
- Cognitive ageing
- BioRobotics for active longevity
- Care support technology
- Environmental engineering