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Advances in Computational Intelligence

13th International Work-Conference
on Artificial Neural Networks, IWANN 2015
Palma de Mallorca, Spain, June 10–12, 2015
Proceedings, Part II

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Preface

We are proud to present the set of final accepted papers for the 13th edition of the IWANN conference “International Work-Conference on Artificial Neural Networks” held in Palma de Mallorca (Spain) during June 10–12, 2015.

IWANN is a biennial conference that seeks to provide a discussion forum for scientists, engineers, educators, and students about the latest ideas and realizations in the foundations, theory, models, and applications of hybrid systems inspired on nature (neural networks, fuzzy logic, and evolutionary systems) as well as in emerging areas related to the above items. As in previous editions of IWANN, it also aims to create a friendly environment that could lead to the establishment of scientific collaborations and exchanges among attendees. The proceedings will include all the presented communications to the conference. It has also foreseen the publication of an extended version of selected papers in a special issue of several specialized journals (such as *Neurocomputing*, *Soft Computing*, and *Neural Processing Letters*).

Since the first edition in Granada (LNCS 540, 1991), the conference has evolved and matured. The list of topics in the successive Call for Papers has also evolved, resulting in the following list for the present edition:

1. **Mathematical and theoretical methods in computational intelligence.** Mathematics for neural networks. RBF structures. Self-organizing networks and methods. Support vector machines and kernel methods. Fuzzy logic. Evolutionary and genetic algorithms.
2. **Neurocomputational formulations.** Single-neuron modelling. Perceptual modelling. System-level neural modelling. Spiking neurons. Models of biological learning.
3. **Learning and adaptation.** Adaptive systems. Imitation learning. Reconfigurable systems. Supervised, non-supervised, reinforcement, and statistical algorithms.
4. **Emulation of cognitive functions.** Decision Making. Multi-agent systems. Sensor mesh. Natural language. Pattern recognition. Perceptual and motor functions (visual, auditory, tactile, virtual reality, etc.). Robotics. Planning motor control.
5. **Bio-inspired systems and neuro-engineering.** Embedded intelligent systems. Evolvable computing. Evolving hardware. Microelectronics for neural, fuzzy, and bioinspired systems. Neural prostheses. Retinomorph systems. Brain–computer interfaces (BCI). Nanosystems. Nanocognitive systems.
6. **Advanced topics in computational intelligence.** Intelligent networks. Knowledge-intensive problem-solving techniques. Multi-sensor data fusion using computational intelligence. Search and meta-heuristics. Soft Computing. Neuro-fuzzy systems. Neuro-evolutionary systems. Neuro-swarm. Hybridization with novel computing paradigms.
7. **Applications.** Expert Systems. Image and Signal Processing. Ambient intelligence. Biomimetic applications. System identification, process control, and manufacturing. Computational Biology and Bioinformatics. Parallel and Distributed Computing.

Human–Computer Interaction, Internet Modeling, Communication and Networking, Intelligent Systems in Education, Human–Robot Interaction, Multi-Agent Systems, Time series analysis and prediction, Data mining and knowledge discovery.

At the end of the submission process, and after a careful peer-review and evaluation process (each submission was reviewed by at least 2, and on the average 2.7, Program Committee members or additional reviewers), 100 papers were accepted for oral or poster presentation, according to the recommendations of reviewers and the authors’ preferences.

It is important to note, that for the sake of consistency and readability of the book, the presented papers are not organized as they were presented in the IWANN 2015 sessions, but classified under 14 chapters. The organization of the papers is in two volumes arranged basically following the topics list included in the Call for Papers. The first volume (LNCS 9094), entitled “IWANN 2015. Advances on Computational Intelligence. Part I” is divided into eight main parts and includes the contributions on:

1. Computing Languages with Bio-Inspired Devices and Multi-Agent Systems (Special Session, organized by: M. Dolores Jiménez-López and Alfonso Ortega de la Puente)
2. Brain-Computer Interfaces: Applications and Tele-services (Special Session, organized by: Ricardo Ron Angevin and Miguel Angel Lopez)
3. Multi-Robot Systems: Applications and Theory (MRSAT) (Special Session, organized by: José Guerrero and Óscar Valero)
4. Video and Image Processing (Special Session, organized by: Enrique Domínguez and Jose Garcia)
5. Transfer Learning (Special Session, organized by: Luis M. Silva and Jorge M. Santos)
6. Structures, algorithms, and methods in artificial intelligence (Special Session, organized by: Daniela Danciu and Vladimir Răsvan)
7. Interactive and Cognitive Environments (Special Session, organized by: Wei Chen and Albert Samá)
8. Mathematical and theoretical methods in Fuzzy Systems

In the second volume (LNCS 9095), entitled “IWANN 2015. Advances on Computational Intelligence. Part II” is divided into six main parts and includes the contributions on:

1. Pattern Recognition
2. Embedded intelligent systems
3. Expert Systems
4. Advances in Computational Intelligence
5. Applications of Computational Intelligence
6. Invited Talks to IWANN 2015

In this edition of IWANN 2015, the plenary talks were given by Prof. Cristina Urdiales (The shared control paradigm for assistive and rehabilitation robots), Prof. Dan Cireșan (Deep Neural Networks for Visual Pattern Recognition), and finally by Prof. Andrea Cavallaro.

The 13th edition of the IWANN conference was organized by the University of Granada, University of Málaga, Polytechnic University of Catalonia, and University of the Balearic Islands, together with the Spanish Chapter of the IEEE Computational Intelligence Society. We wish to thank the University of the Balearic Islands for their support and grants.

We would also like to express our gratitude to the members of the different committees for their support, collaboration, and good work. We specially thank the Local Committee, Program Committee, the Reviewers, Invited Speaker, and Special Session Organizers. Finally, we want to thank Springer, and especially Alfred Hoffman and Anna Kramer for their continuous support and cooperation.

June 2015

Ignacio Rojas
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