CrossMark

Editorial

Andreu Catalá Mallofré[1] · **Gonzalo Joya Caparrós[2]** ·
Ignacio Rojas Ruiz[3]

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.

Since the first edition in Granada (LNCS 540, 1991), the conference has evolved and matured, and most of the topics involved have achieved a maturity and reinforced consolidation. The thirteenth edition of the IWANN conference "International Work-Conference on Artificial Neural Networks" was held in Palma de Mallorca, (Spain) during June 10–12, 2015. 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.
2. Neurocomputational formulations.
3. Learning and adaptation.
4. Emulation of cognitive functions.
5. Bio-inspired systems and neuro-engineering.
6. Advanced topics in computational intelligence.
7. Applications.

At the end of the submission process of IWANN 2015, and after a careful peer review and evaluation process (each submission was reviewed by at least 2, and on the average

✉ Andreu Catalá Mallofré
andreu.catala@upc.edu

1 Technical Research Centre for Dependency Care and Autonomous Living, Universitat Politécnica de Catalunya, Neapolis Building, Rambla de l'Exposició, 59-69, 08800 Vilanova i la Geltrú, Barcelona, Spain

2 Dpto. Tecnología Electrónica, ETSI Telecomunicación, Universidad de Málaga, Campus de Teatinos s/n, 29017 Malaga, Spain

3 E.T.S. Ingenierías Informática y de Telecomunicación, Dpto. Arquitectura y Tecnología de Computadores, Universidad de Granada, C/ Periodista Daniel Saucedo Aranda s/n, 18071 Granada, Spain

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.

High-quality candidate papers (12 contributions) were invited to submit an extended version of their conference paper to be considered for special publication in this issue of Neural Processing Letters. These authors were selected after the recommendation of the reviewers of the conference papers, the opinion of the chairs of the different sessions and the guest editors. At least three independent and anonymous experts again carefully reviewed the extended versions and finally 9 papers were selected as appropriate for publication. In the present issue of Neural Processing Letters, it is a pleasure to present you these contributions that provide a clear overview of the thematic areas covered by the IWANN conference, ranging from theoretical aspects to real-world applications of nature-inspired system.

The first paper, "Ensemble of Efficient Minimal Learning Machines for Classification and Regression" by João Gomes et al. presents a methodology based in the implementation of ensembles of Minimal Learning Machines (MLM) following the well-known rules of ensemble generation and classification combination. Additionally a simplification of the output estimation step in MLM helps to reduce the complexity and speeding up the whole process. The performance evaluation of the method is contrasted to state of the art algorithms and with real data sets from UCI achieving not only higher performance in classification in the majority of examples but also a lower standard deviation.

The second paper, "Identifying Market Behaviours Using European Stock Index Time Series by a Hybrid Segmentation Algorithm" by Antonio Durán-Rosal et al. is focused in development of a hybrid optimisation time series segmentation methodology combined with a clustering strategy to identify common patterns that would act as early signals for trends change. The method was applied to the Spanish stock market index, IBEX 35, with the diary data during 22 years accomplishing consistent results with the key milestones of the index. The paper opens the door for further work in future prediction of trends in stock market behaviour.

The third paper, "Learners Reliability Estimated Through Neural Networks Applied to Build a Novel Hybrid Ensemble Method" by Marco Vanucci et al. presents an approach based on the balance of the effect of a classification between a general algorithm, Strong Learner, and a set of Weak Learners specialized in a particular regions of the data space that come from the application of a self organizing map. The approach obtains the classification of the different inputs based on the estimated confidence of the WL or SL overcoming some of the criticalities encountered by standard Ensemble Methods. This hybrid algorithm has been tested in UCI standard data set and other data sets coming from industrial contexts achieving satisfactory result on both.

In the forth paper, "Interpreting Decision Support from Multiple Classifiers for Predicting Length of Stay in Patients with Colorectal Carcinoma" by Ruxandra Stoean et al. the authors address the problem of estimating the length of a hospitalization stay. The case of study focuses on patients that have been operated of colorectal cancer, from an important actual database used and published for the first time in this work. The paper presents the implementation and comparison of two kinds of classifiers: black-box methods, comprising Support Vector Machines and Neural Networks; and rule based methods such as Decision Trees and a new evolutionary computation-based classifier. In a second part, the authors concentrate on the study of the two rule based techniques, motivated by the fact that the knowledge that these methods provide is particularly well suited for interaction with medical experts.

The fifth paper, "Deep Neural Networks for Wind and Solar Energy Prediction" by David Díaz-Vico et al. presents an interesting historical and methodological revision of Deep Neu-

ral Networks, and applies different single and ensemble versions of Convolutional Neural Networks to wind energy and daily solar radiation prediction problems. This neural model takes advantage of the spatial structure of the patterns in both problems, so improving the results obtained by the Support Vector Regression, which may be considered the reference method.

The sixth paper, "Multi-Domain Transfer Component Analysis for Domain Generalization" by Thomas Grubinger et al. addresses the issue of how to use knowledge acquired from related domains for applying it to new domains. The authors propose two extensions of the Transfer Component Analysis technique: Multi-TCA (oriented to multiple domains) and Multi_SSTCA (oriented to semi-supervised learning). Both methods are compared to other methods of domain generalization: Domain Invariant Component Analysis (DICA) and its unsupervised version (UDICA). The paper addresses two application problems: landmine detection based on airbone radar measurements, and prediction of the clinicials score of the Parkinson disease symptoms

The seventh paper, "Testing Different Ensemble Configurations for Feature Selection" by Borja Seijo-Pardo et al. presents an interesting analysis of several techniques available for feature selection, mainly focused in ensemble learning. The authors provide a comprehensive study of the techniques available for this task. The authors propose several feature selection ensemble configurations based on combining rankings of features from individual rankers according to the combination method and threshold value used, performing an experimental validation on different datasets (synthetic and real classical datasets in conjunction with and DNA microarray dataset). The suitability of different ensemble configurations combining methods and threshold values were analysed and their performance was compared to that of the individual methods (for each dataset type different classifiers, combination methods and threshold values were evaluated).

The eighth paper, "Toward a Possibilistic Swarm Multi-robot Task Allocation: Theoretical and Experimental Results" by José Guerrero et al. is focused in the complex problem of selecting the best task to execute (task allocation problem) in multi-robot systems. In order to solve this problem, a methodology based on fuzzy Markov chains (instead of frequently used probabilistic processes) is proposed, demonstrating that fuzzy Markov chains associated to a task allocation problem can converge to a stationary stage in a finite number of steps, predicting with good accuracy the future behavior of the system in the presence of vagueness when measuring distances. By experimental results, the authors show that the proposed possibilistic methodology reduce 10 times the number of steps required to reach an stable state and improve more than 60% the predictions of the system behavior compared to probabilistic Markov chains.

In the ninth paper, "FPGA Implementation of Neurocomputational Models: Comparison Between Standard Back-Propagation and C-Mantec Constructive Algorithm" by Leonardo Franco et al. the authors analyze the problem of implementing neurocomputational models on FPGA systems (faster and more efficient in parallel computing than a standard computer). The viability of hardware implantations on FPGA is analyzed using two different algorithms: Backpropagation and C-Mantec (a constructive neural network algorithm that generates compact one hidden layer architectures with good predictive capabilities). The advantages and disadvantages of both methods in relationship to their hardware implementations are discussed, presenting a comparison regarding the possibilities of the application (focusing in features like logic and memory resources needed, transfer function implementation, computation time, etc).

The Guest Editors would like to express their gratitude to all the people who supported them in the compilation of this special issue, and especially to the contributing authors for

their submissions and to the anonymous reviewers for their comments and useful suggestions in order to improve the quality of the papers.

They would also like to express their gratitude to the Editor-in-Chief M. Verleysen and the Production Editor Devi Selvaraj, for providing us with the opportunity to publish this set of selected papers in the present issue. It is a pleasure for us to invite all authors and interested readers of this issue to future IWANN conferences, which will be announced at http://iwann.uma.es