Guest-editorial

The VIIth Brazilian Symposium on Neural Networks (SBRN'02)

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The VIIth Brazilian Symposium on Neural Networks (SBRN'02), held in 2002 at Porto de Galinhas-Pernambuco, was sponsored by the Brazilian Computer Society (SBC) and co-sponsored by SIG/INNS/Brazil Special Interest Group of the International Neural Networks Society in Brazil.

The articles submitted to this year's SBRN provide a more representative distribution of research around the country than previously, when submissions came primarily from the more established universities. There were submissions from authors of all regions of Brazil and countries like Argentina, Belgium, England, France, Italy, Japan, Peru, Portugal and Spain. All these papers were subjected to a rigorous review process.

The SBRN'02 Proceedings were published in two volumes [1,2]. Volume I includes the accepted full papers in English, together with the abstracts of papers originally written in Portuguese or Spanish. Volume II contains only the full papers written in Portuguese and Spanish.

After a new round of careful review, eleven papers in the SBRN'02 Proceedings were selected to be extended and included in this Special Issue of the *Journal of Intelligent & Fuzzy Systems*. In order to put the SBRN'02 into perspective, the scope of the papers selected for this Special Issue has been interdisciplinary, ranging from Mathematics, Computing, Engineering, and Cognitive Science:

– A novel class of recurrent neural fuzzy networks is presented by Rosangela Ballini and Fernando Gomide. Computational experiments show that these neurofuzzy networks provide high performance in terms of approximation capability, memory requirements, and processing time when compared to its counterparts.
– Marcelo A. Costa, Antônio P. Braga and Benjamim R. de Menezes introduce new constructive and pruning methods, which combine different paradigms, for controlling the neural network (Multi-layer Perceptron) generalization. In order to guarantee generalization, the proposed methods use a multi-objective approach.
– Artificial neural networks are investigated from the point of view of Turing's analysis of computation by Wilson R. de Oliveira, Marcílio C.P. de Souto, and Teresa B. Ludermir. They propose a type of neural Turing simulation that, according to their arguments, are consistent with Turing's analysis of computation and current cognitive theories based on agent-environment interaction, and it is physically realizable. From this study in artificial neural networks, a new sub-class of Turing machines is defined.
– Gina M.B. Oliveira, Oscar K.N. Asakura, and Pedro P.B. de Oliveira extend previous results in incorporating a parameter-based heuristic into

a standard, single population Genetic Algorithm (GA). Then, they analyze the influence of incorporating that heuristic into the coevolutionary search.

– The work developed by Estefane G.M. de Lacerda, André de Carvalho, and Teresa B. Ludermir addresses the problem of finding the adjustable parameters of a learning algorithm – model selection – by using GAs. In order to so, some model selection techniques, such as crossvalidation and bootstrap, are used as objetive functions of the AGs. One of the applications shown is the design of RBF networks.

– Letícia M. Friske and Carlos H.C. Ribeiro compare, by using different setting of experiments, the use of two classes of options as basic action units for Reinforcement Learning algorithms. One of the options is defined as fixed sequences of actions O_S, and the other can be seen as a group of state-action pairs O_Π.

– Ivan G. Costa, Francisco A.T. de Carvalho and Marcílio C.P. de Souto develop a comparative study on the proximity indices for cluster analysis of gene expression time series data. In order to evaluate the results, an adaptation of the k-fold cross-validation suitable for unsupervised learning is used.

– A neuro-fuzzy system based on competitive learning able to solve multiple criteria optimization problems is presented by Lalinka C.T. Gomes and Fernando J. Von Zuben. The effectiveness of the proposed method is assessed by means of a series of computational simulations on standard data (e.g. the capacitated vehicle routing problem).

– Marcelo A. Teixeira and Gerson Zaverucha propose modifications for the Naive Bayes Classifier and Hidden Markov Model to enable them to predict numerical values by incorporating features from fuzzy systems. These hybrid systems are successfully compared with two traditional forecasting methods, Box – Jenkins and Winters exponential smoothing.

– A novel approach to identifying harmonics in power system distorted waveforms is proposed by Renata A. Macêdo, Donato da Silva-Filho, Denis V. Coury, Adriano A.F.M. Carneiro, and André de Carvalho. Such an approach is based on GAs. The results obtained show that this method is more precise than traditional Fourier transform.

– Alex S. Palmer, Moe Razaz and Danilo P. Mandic introduce an efficient image restoration algorithm, based on a modified adaptive Hopfield neural network. The improvement in restoration quality, due to the proposed method, is illustrated with simulations on benchmark imagens.

We would like to express our thanks to the authors who accepted our invitation to submit papers to this Special Issue. We are also grateful to all the reviewers, including the members of the Program Committee, who helped us in reviewing the submitted papers guaranteeing the quality of the event and of this Special Issue. They are: Paulo J.L. Adeodato, Igor Aleksander, Marcelo B. de Almeida, Gladstone M. Arantes Jr., Aluizio F.R. Araújo, Pierre Baldi, Carlos R.H. Barbosa, Valmir C. Barbosa, Guilherme de A. Barreto, Allan Kardec D. Barros, Amit Bhaya, Antônio de P. Braga, Artur P. de S. Braga, Anne M. de P. Canuto, Otavio A.S. Carpinteiro, André P.L.F. de Carvalho, Luis A.V. de Carvalho, George Cavalcanti, H. Alejandro Ceccatto, Alexandre Correa, Anna H.R. Costa, Marcelo A. Costa, Phillipe DeWilde, Raul Q. Feitosa, Cristiano A.C. Fernandes, Felipe França, Paolo Frasconi, Roberto K.H. Galvão, Artur Garcez, Fernando Gomide, Maria Eunice Gonzalez, Stephen Grossberg, Elder M. Hermerley, Karl H. Kienitz, Bart Kosko, Estefane G.M. Lacerda, Wilian S. Lacerda, Juan L. Lazo, Marcos A.C. de Lima, Teresa B. Ludermir, Wolfgang Maass, Sanya Mitaim, Cairo L. Nascimento, Victor Navarro, Márcio L. de Andrade Netto, Gina M.B. de Oliveira, José R.C. Piqueira, José Príncipe, Guilherme F. Ribeiro, Carlos H.C. Ribeiro, Leizer Schnitman, Jude W. Shavlik, William Soares Filho, Marcílio C.P. de Souto, Harold Szu, Marcelo A. Teixeira, Edison Tito, Yvan J.T. Valdivia, Germano C. Vasconcelos, Marley Vellasco, Karla Vittori, Iuri Wickert, Zhijun Yang, Hani C. Yehia, Takashi Yoneyama, Gerson Zaverucha, Jacek Zurada.

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References

[1] Proceedings of the VIIth Brazilian Symposium on Neural Networks, T.B. Ludermir and M.C.P. de Souto, (eds). Volume 1, IEEE Computer Society Press, 2002.

[2] Proceedings of the VIIth Brazilian Symposium on Neural Networks, T.B. Ludermir and M.C.P. de Souto, (eds), Volume 2, Brazilian Computing Society, 2002, in Portuguese.