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Miroslav Kárný (eds.)

Artificial Neural Nets
and Genetic Algorithms

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Preface

The first ICANNGA conference, devoted to biologically inspired computational paradigms, *Neural Networks and Genetic Algorithms*, was held in Innsbruck, Austria, in 1993. The meeting attracted researchers from all over Europe and further afield, who decided that this particular blend of topics should form a theme for a series of biennial conferences. The second meeting, held in Ales, France, in 1995, carried on the tradition set in Innsbruck of a relaxed and stimulating environment for the exchange of ideas. The series has continued in Norwich, UK, in 1997, and Portoroz, Slovenia, in 1999.

The Institute of Computer Science, Czech Academy of Sciences, is pleased to host the fifth conference in Prague. We have chosen the Liechtenstein palace under the Prague Castle as the conference site to enhance the traditionally good atmosphere of the meeting. There is an inspirational *genius loci* of the historical center of the city, where four hundred years ago a fruitful combination of theoretical and empirical method, through the collaboration of Johannes Kepler and Tycho de Brahe, led to the discovery of the laws of planetary orbits.

In this conference, theoretical insights and reports on successful applications are both strongly represented. It is especially pleasing to observe the dual affinity with biology. There are papers dealing with cognition, neurocontrol, and biologically inspired brain models, while there are also descriptions of successful applications of computational methods to biology and environmental science. Theoretical contributions cover a variety of topics including nonlinear approximation by feedforward networks, representation of spiking perceptrons by classical ones, recursive networks and associative memories, learning and generalization, population attractors, and proposals and analyses of new genetic operators or measures. These theoretical studies are augmented by a wide selection of application-oriented papers on topics ranging from signal processing, control, pattern recognition and time series prediction to routing tasks.

To keep track of the rapid development of the field of computational intelligence and to further extend the original focus of ICANNGA on blending various computational methods and approaches to solve hard real-world problems, we have extended the scope of the conference by adding some special sessions.

The first one, *Hybrid Methods and Tools*, concentrates on theoretical, algorithmic and applied aspects of combinations of methods from the soft computing area, neural networks, evolutionary algorithms, fuzzy logic and probabilistic computing and symbolic artificial intelligence.

The second one, *Computer-Intensive Methods in Control and Data Processing*, aims to attack the "curse of dimensionality". It specializes in methods for handling the problem of implementation of optimal mathematical procedures of approximation, inference and decision-making in a variety of fields such as control, data processing, image reconstruction, pattern recognition and nonparametric estimation. This session is a continuation of a series of workshops organized by the Institute of Information Theory and Automation that have been held in Prague every two years since 1992.

To emphasize the importance of applications of combined computational methods to environmental issues, we have also included a special session devoted to *Data Mining in Meteorology and Air Pollution*. The session focuses on data mining and statistical methods applied to modelling and forecasting of highly complex time series and spatio-temporal data from air pollution and meteorology. The methods include neural networks, genetic algorithms, statistical data processing, wavelet functions, adaptive filters and rule-based approaches.

It is our pleasure to express our gratitude to everyone who contributed in any way to the success of the event and the completion of this volume. In particular, we thank ICANNGA's founding members, who, via the Advisory Committee, keep the tradition of the series and help with the organization. We thank all the members of the Program Committee for careful and prompt reviewing of the submissions. With deep gratitude we thank the members of the Organizing Committee, whose efforts made the vision of the 5th ICANNGA a practical reality. Our excellent ICANNGA secretary Hana Bílková deserves special thanks. We thank Action M Agency for perfect local arrangements. Last but not least, we thank all authors who contributed to this volume to share their new ideas and results with the community of researchers in this rapidly developing field of biologically motivated computer science.

We hope that you enjoy reading and find inspiration for your future work in the papers contained in this volume.

*Věra Kůrková, Roman Neruda, Miroslav Kárný*
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