

Preface

The present book includes extended and revised versions of a set of selected papers from the Fifth International Joint Conference on Computational Intelligence (IJCCI 2013). Sponsored by the Institute for Systems and Technologies of Information, Control and Communication (INSTICC), IJCCI 2013 was held in Vilamoura, Algarve, Portugal, from 20 to 22 September, 2013, and was organized in cooperation with the AAAI—Association for the Advancement of Artificial Intelligence, APNNA—Asia Pacific Neural Network Assembly, and ACM SIGART—ACM Special Interest Group on Artificial Intelligence.

Since its first edition in 2009, the purpose of the International Joint Conference on Computational Intelligence (IJCCI) has been to bring together researchers, engineers and practitioners in computational technologies, especially those related to the areas of fuzzy computation, evolutionary computation and neural computation. IJCCI is composed of three co-located conferences, each one specialized in one of the aforementioned areas. Namely:

- International Conference on Evolutionary Computation Theory and Applications (ECTA)
- International Conference on Fuzzy Computation Theory and Applications (FCTA)
- International Conference on Neural Computation Theory and Applications (NCTA)

Their aim is to provide major forums for scientists, engineers and practitioners interested in the study, analysis, design, and application of these techniques to all fields of human activity.

In ECTA, modeling and implementation of bio-inspired systems namely on the evolutionary premises, both theoretically and in a broad range of application fields, is the central scope. Considered as a subfield of computational intelligence focused on combinatorial optimization problems, evolutionary computation is associated with systems that use computational models of evolutionary processes as the key elements in design and implementation, i.e., computational techniques which are

inspired by the evolution of biological life in the natural world. A number of evolutionary computational models have been proposed, including evolutionary algorithms, genetic algorithms, evolution strategies, evolutionary programming, swarm optimization, and artificial life.

In FCTA, results and perspectives of modeling and implementation of fuzzy systems, in a broad range of fields, are presented and discussed. Fuzzy computation, based on the theory of fuzzy sets and fuzzy logic, is dedicated to the solution of information processing, system analysis, knowledge extraction from data, and decision problems. Fuzzy computation takes advantages of the powerful available technologies to find useful solutions for problems in many fields, such as medical diagnosis, automated learning, image processing, and understanding, and systems control.

NCTA is focused on modeling and implementation of artificial neural networks computing architectures. Neural computation and artificial neural networks have seen a continuous explosion of interest in recent decades, and are being successfully applied across an impressive range of problem domains, including areas as diverse as finance, medicine, engineering, geology, and physics, providing appealing solutions to problems as varied as prediction, classification, decision making, or control. Numerous architectures, learning strategies, and algorithms have been introduced in this highly dynamic field in the last couple of decades.

During the joint conference, IJCCI received 111 paper submissions from 30 countries, which demonstrates the global dimension of this conference. Of 111 papers, 24 papers were published as full papers (21.6 % of submissions) and 29 were accepted for short presentation (26 % of submissions). Moreover, 13 were accepted for poster presentation. These ratios denote a high level of quality which we aim to continue reinforcing in the next edition of this conference. This book includes revised and extended versions of a strict selection of the best papers presented at the conference.

On behalf of the Conference Organizing Committee, we would like to thank all participants. First of all, to the authors, whose quality work is the essence of the conference, and to the members of the Program Committee, who helped us with their expertise and diligence in reviewing the papers. As we all know, producing a post-conference book, within the high technical-level exigency, requires efforts of many individuals. We wish also to thank all the members of our Organizing Committee, whose work and commitment were invaluable.

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