Studies in Computational Intelligence

Volume 547

Series editor

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The series "Studies in Computational Intelligence" (SCI) publishes new developments and advances in the various areas of computational intelligence—quickly and with a high quality. The intent is to cover the theory, applications, and design methods of computational intelligence, as embedded in the fields of engineering, computer science, physics and life sciences, as well as the methodologies behind them. The series contains monographs, lecture notes, and edited volumes in computational intelligence spanning the areas of neural networks, connectionist systems, genetic algorithms, evolutionary computation, artificial intelligence, cellular automata, self-organizing systems, soft computing, fuzzy systems, and hybrid intelligent systems. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution, which enable both wide and rapid dissemination of research output.

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Recent Advances on Hybrid Approaches for Designing Intelligent Systems

Springer

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ISSN 1860-949X
ISSN 1860-9503 (electronic)
ISBN 978-3-319-05169-7
ISBN 978-3-319-05170-3 (eBook)
DOI 10.1007/978-3-319-05170-3
Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2014935275

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

We describe, in this book, recent advances on hybrid intelligent systems using soft computing techniques for diverse areas of application, such as intelligent control and robotics, pattern recognition, time series prediction, and optimization complex problems. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks, and bio-inspired optimization algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized into five main parts, which contain a group of papers around a similar subject. The first part consists of chapters with the main theme of type-2 fuzzy logic, which basically consists of chapters that propose new models and applications for type-2 fuzzy systems. The second part contains papers with the main theme of bio-inspired optimization algorithms, which are basically chapters using nature-inspired techniques to achieve optimization of complex optimization problems in diverse areas of application. The third part contains chapters that deal with new models and applications of neural networks in real world problems. The fourth part contains chapters with the theme of intelligent optimization methods, which basically consider the proposal of new methods of optimization to solve complex real world optimization problems. The fifth part contains chapters with the theme of evolutionary methods and intelligent computing, which are chapters considering soft computing methods for applications related to diverse areas, such as natural language processing, recommending systems and optimization.

In the part of type-2 fuzzy logic, there are nine chapters that describe different contributions that propose new models and concepts, which can be the considered as the basis for achieving applications for real-world problems that can have a better management of uncertainty. In the part of bio-inspired algorithms, there are 11 chapters that describe different contributions on proposing new bio-inspired algorithms and their application to solve complex optimization problems. The bio-inspired methods include variations of ant colony optimization and particle swarm optimization, as well as new nature inspired paradigms. In the part of neural networks, there are 10 chapters that describe different contributions of new algorithms and models for neural networks and their application to diverse complex problems in pattern recognition and time series prediction. In the part of intelligent optimization applications, there are 10 contributions that describe the development of new models and algorithms relevant to complex optimization

problems, as well as the application of these intelligent optimization techniques in real-world applications. In the part of evolutionary methods and intelligent computing there are 10 contributions on models and algorithms based on computational intelligent techniques, including novel evolutionary approaches, that are presented, as well as their applications to different real-world problems, such as in recommending systems and natural language processing.

In conclusion, the edited book comprises chapters on diverse aspects of bio-inspired models, soft computing and hybrid intelligent systems for control, mobile robotics, pattern recognition, time series prediction, and other complex real world problems. There are theoretical aspects as well as application chapters.

January 8, 2014

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