

# **Studies in Computational Intelligence**

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Editors

# Hybrid Intelligent Systems in Control, Pattern Recognition and Medicine

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# Preface

We describe in this book, recent advances on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas, such as intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. This book is organized into five main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. The second part contains papers with the main theme of pattern recognition and applications, which are basically papers dealing with new concepts and algorithms in neural networks and fuzzy logic applied in recognition. The third part contains papers that present theory and practice of meta-heuristics in different areas of application. The fourth part presents diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications. Finally, the fifth part contains papers describing applications of fuzzy logic, neural networks and meta-heuristics in robotics problems.

In the first part of this book with four papers, we refer to theoretical aspects and applications of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 for different applications. The aim of using type-2 fuzzy logic is to provide better uncertainty management in problems of control, pattern recognition and prediction.

In the second part of pattern recognition theory and applications, there are three papers that describe different contributions that propose new models, concepts and algorithms for recognition applications. The aim of using neural networks and fuzzy logic is to provide learning and adaptive capabilities to intelligent pattern recognition systems.

In the third part of the theory and practice of meta-heuristics in different areas of application, there are six papers that describe different contributions that propose new models and concepts, which are also applied in diverse areas of application. The nature-inspired methods include variations of different methods as well as new nature-inspired paradigms.

The fourth part presents diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications, and there are five papers that describe different contributions on the application of these kinds of systems to solve complex real-world medical problems.

In the fifth part of fuzzy logic, neural networks and meta-heuristic applications in robotics, there are six papers that describe different contributions on the application of these kinds of intelligent models to solve complex real-world robotic problems.

In conclusion, the edited book comprises papers on diverse aspects of fuzzy logic, neural networks and nature-inspired optimization meta-heuristics and their application in areas, such as intelligent control and robotics, pattern recognition, time series prediction and optimization of complex problems. There are theoretical aspects as well as application papers.

Tijuana, Mexico  
December 2018

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