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Computational Intelligence in Complex Decision Systems

Da Ruan

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Atlantis Computational Intelligence Systems

Volume 1: Linguistic Values Based Intelligent Information Processing: Theory, Methods, and Applications – Zheng Pei, Da Ruan, Jun Liu, Yang Xu

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Preface

In recent years there has been a growing interest in the need for designing computational intelligence to address complex decision systems. One of the most challenging issues for computational intelligence is to effectively handle real-world uncertainties that cannot be eliminated. These uncertainties include various type of information that is incomplete, imprecise, fragmentary, not fully reliable, vague, contradictory, deficient, and overloading. These uncertainties result in a lack of the full and precise knowledge of the decision system including the determining and selection of evaluation criteria, alternatives, weights, assignment scores, and the final integrated decision result. Computational intelligent techniques including fuzzy logic, neural networks, and genetic algorithms etc., as complimentary to the existing traditional techniques, have shown great potential to solve these demanding, real-world decision problems that exist in uncertain and unpredictable environments. These technologies have formed the foundation for computational intelligence.

To overview the role of computational intelligence in information-driven complex decision systems and illustrate the potential use and practical applications of computational intelligence related techniques in complex decision systems, this edited volume presents recent research results and provides a state-of-the-art on the future research directions. The book gathers a peer-reviewed collection of a number of representative applications of *Computational Intelligence in Complex Decision Systems*. It contains 13 chapters written by 25 authors from Australia, Belgium, Brazil, China, India, Japan, Portugal, Spain, Turkey, the UK, and the USA. These contributions and applications cover Complex Decision Systems ranging from Computational Intelligence (Chapter 1 by Kahraman *et al.*), Dynamically Changing Input Data (Chapter 2 by Pais *et al.*), Possibilistic Linear Programming (Chapter 3 by Guo), Virtual Reality (Chapter 4 by Machado and de Moraes), Many-Valued Temporal Logic and Reasoning (Chapter 5 by Lu *et al.*), Statistical Approach (Chapter 6

by Kunsch), Web based Assessment Tool (Chapter 7 by Xu), Intelligent Policy Simulator (Chapter 8 by Rao), Computing with Words (Chapter 9 by Mendel and Wu), Policy Realization (Chapter 10 by Kahraman and Kaya), Load Dispatch (Chapter 11 by Zhang *et al.*), Smart Home (Chapter 12 by Muñoz *et al.*), to Agile Supply Chain Strategies (Chapter 13 by Büyüközkan).

Each chapter of the book is self-contained. Academic and applied researchers and research students working on complex decision systems can also benefit from this book.

March 2010

Da Ruan

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