Foreword

Biologically inspired data mining techniques have been widely accepted as a way to improve the existing Knowledge Discovery and Data Mining (KDD) techniques. There has been an enormous growth in the number of biologically inspired techniques that exhibit natural processes, simplicity, extendibility, adaptability, flexibility, and interpretability. The research community has taken the research one step further than basic optimization problems to knowledge discovery and data mining, exploiting the efficiency and accuracy of these techniques.

Artificial Neural Networks (ANN), Genetic Algorithms (GA), and Swarm Intelligence (SI) are leading bio-inspired techniques that have not only contributed to solving traditional optimization problems but also to making their impact on solving other diverse real-world problems including KDD.

The book contains original works on biologically inspired techniques, including ANN, Ant Colony Optimization (ACO) and Ant Programming, Particle Swarm Optimization (PSO), Self Organizing Maps (SOM), Artificial Bee Colony (ABC), GA, and Genetic Programming (GP). The application areas discussed in this book include research on mobile robot dynamics, data classification, machine fault diagnosis, predicting trends in oil prices, civil engineering, real time distributed systems, sequence sorting, air quality monitoring, security of wireless devices.

Overall, the research work presented in this book contributes to the further development of biologically inspired KDD techniques and their applications. We expect in the future more methods from the areas of Bioinformatics and Neuroinformatics to be adopted in the KDD area for solving complex problems, including data mining and knowledge discovery from large streams of data. A promising approach in this respect is neuromorphic computation, both as brain-inspired algorithms and as hardware implementations for high performance and low energy information processing at a large scale. I hope the book will serve the purpose and bring diverse research communities together, validating and evaluating work from two different perspectives. I am pleased in recommending this book to be used as a reference book by both communities of bio-inspired algorithms and KDD.

_Nikola Kasabov_
_Auckland University of Technology, New Zealand_
Nikola Kasabov is the Foundation Director of the Knowledge Engineering and Discovery Research Institute (KEDRI, www.kedri.aut.ac.nz) and Chair of Knowledge Engineering at the School of Computer and Information Sciences at Auckland University of Technology. He is a Fellow of IEEE, Fellow of the Royal Society of New Zealand, Fellow of the Institute of IT Professionals in NZ, Distinguished Visiting Fellow at the Royal Academy of Engineering, UK, and EU Marie Curie Fellow. He holds a MSc and PhD from the Technical University of Sofia. His main research interests are in the areas of intelligent information systems, soft computing, neuro-computing, bioinformatics, brain study, speech and image processing, data mining, and knowledge discovery. He has been actively working in the area of bio-inspired KDD with more than 550 publications published. He is the co-editor-in-chief of the Springer journal Evolving Systems, Editor of the Springer series of Bio-/Neuroinformatics and the Springer Handbook of Bio-/Neuroinformatics (2014).