# Table of Contents

Preface ........................................................................................................................................... xviii

Acknowledgment ........................................................................................................................ xxvii

## Section 1
**Big Data Mining and Pattern Discovery**

### Chapter 1
Unleashing Artificial Intelligence onto Big Data: A Review ................................................................. 1
*Rupa Mahanty, Tata Consultancy Services, Australia
Prabhat Kumar Mahanti, University of New Brunswick, Canada*

### Chapter 2
Hybrid Ensemble Learning Methods for Classification of Microarray Data: RotBagg Ensemble Based Classification .................................................................................................................. 17
*Sujata Dash, North Orissa University, India*

### Chapter 3
Recent Trends in Spatial Data Mining and Its Challenges ................................................................. 37
*Anuradha Jagadeesan, VIT University, India
Prathik A, VIT University, India
Tripathy B K, VIT University, India*

### Chapter 4
Knowledge Representation: A Semantic Network Approach ............................................................ 55
*Atta ur Rahman, Barani Institute of Information Technology, Pakistan*

## Section 2
**Computational Intelligence in Bioinformatics**

### Chapter 5
Development of Novel Multi-Objective Based Model for Protein Structural Class Prediction .......... 76
*Bishnupriya Panda, Siksha O Anusandhan University, India
Babita Majhi, G.G Viswavidyalaya, India*
Chapter 6
Rough Fuzzy Set Theory and Neighbourhood Approximation Based Modelling for Spatial Epidemiology ...................................................................................................................................... 108
  Balakrushna Tripathy, VIT University, India
  Sharmila Banu K., VIT University, India

Chapter 7
Applying CI in Biology through PSO .................................................................................................................. 119
  Rojalina Priyadarshini, C. V. Raman College of Engineering, India
  Nilamadhab Dash, C. V. Raman College of Engineering, India
  Brojo Kishore Mishra, C. V. Raman College of Engineering, India
  Rachita Misra, C. V. Raman College of Engineering, India

Chapter 8
Application of Rough Set Based Models in Medical Diagnosis .............................................................................. 144
  Balakrushna Tripathy, VIT University, India

Chapter 9
Application of Uncertainty Models in Bioinformatics ............................................................................................ 169
  B.K. Tripathy, VIT University, India
  R.K. Mohanty, VIT University, India
  Sooraj T.R., VIT University, India

Section 3
Nature-Inspired Computing for Analysis of DNA and Protein Microarray Data

Chapter 10
Computational Methods for Prediction of Protein-Protein Interactions: PPI Prediction Methods ..... 184
  Sneha Rai, Netaji Subhas Institute of Technology, India
  Sonika Bhatnagar, Netaji Subhas Institute of Technology, India

Chapter 11
Analysis of Microarray Data using Artificial Intelligence Based Techniques ...................................................... 216
  Khalid Raza, Jamia Millia Islamia, India

Chapter 12
Extraction of Protein Sequence Motif Information using Bio-Inspired Computing ........................................... 240
  Gowri Rajasekaran, Periyar University, India
  Rathipriya R, Periyar University, India

Chapter 13
Study of Basic Concepts on the Development of Protein Microarray - Gene Expression Profiling:
Protein Microarray ................................................................................................................................................. 263
  P. Sivashanmugam, National Institute of Technology, India
  Arun C., National Institute of Technology, India
  Selvakumar P., National Institute of Technology, India
Chapter 14
Personalized Medicine in the Era of Genomics ................................................................. 296
  Navneet Kaur Soni, Delhi Technological University, India
  Nitin Thukral, Delhi Technological University, India
  Yasha Hasija, Delhi Technological University, India

Section 4
Bio-Inspired Algorithms and Engineering Applications

Chapter 15
Evolutionary Computing Approaches to System Identification ..................................... 329
  Bidyadhar Subudhi, NIT Rourkela, India
  Debashisha Jena, National Institute of Technology, India

Chapter 16
BFO Optimized Automatic Load Frequency Control of a Multi-Area Power System .......... 369
  Pravat Kumar Ray, National Institute of Technology Rourkela, India
  Sushmita Ekka, National Institute of Technology Rourkela, India

Chapter 17
Solution of Some Differential Equation in Fuzzy Environment by Extension Principle Method and Its Application in Biomathematics ................................................................. 413
  Sankar Prasad Mondal, National Institute of Technology, India

Chapter 18
Application of Computational Intelligence Techniques in Wireless Sensor Networks the State of the Art ............................................................................................................................................. 441
  Subhendu Kumar Pani, Biju Patnaik University of Technology, India

Compilation of References ........................................................................................................ 462

About the Contributors .............................................................................................................. 505

Index .......................................................................................................................................... 511