Studies in Computational Intelligence 547

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Recent Advances on Hybrid Approaches for Designing Intelligent Systems



Larry R. Medsker

Recent Advances in Computational Intelligence Raman Kumar, Uffe Kock Wiil, 2019-03-23 This book comprehensively addresses computational intelligence including the theories methodologies and techniques underlying this evolving field as well as its potential uses in various domains across the entire spectrum of the sciences the natural sciences health sciences engineering social sciences and humanities and in various types of business Computational intelligence is rapidly spreading into all kinds of products and services This calls for the adaptation of existing theories methodologies and techniques and the development of wholly new ones to ensure the successful implementation of new intelligent products and services in various domains related to public organizations businesses and everyday life This book gathers contributions from various experts working on different aspects and implementations of computational intelligence which address new developments in theory analytical and numerical simulation and modeling experimentation deployment and case studies results of laboratory or field operational tests and ongoing advances in computational intelligence It is intended for a broad audience including researchers engineers policymakers industry experts and students offering these readers essential information on and new inspirations regarding the potential of computational intelligence **Recent Advances in Computational Intelligence in Defense and Security** Rami Abielmona, Rafael Falcon, Nur Zincir-Heywood, Hussein A. Abbass, 2015-12-21 This volume is an initiative undertaken by the IEEE Computational Intelligence Society's Task Force on Security Surveillance and Defense to consolidate and disseminate the role of CI techniques in the design development and deployment of security and defense solutions Applications range from the detection of buried explosive hazards in a battlefield to the control of unmanned underwater vehicles the delivery of superior video analytics for protecting critical infrastructures or the development of stronger intrusion detection systems and the design of military surveillance networks Defense scientists industry experts academicians and practitioners alike will all benefit from the wide spectrum of successful applications compiled in this volume Senior undergraduate or graduate students may also discover uncharted territory for their own research endeavors

Recent Advances in Swarm Intelligence and Evolutionary Computation Xin-She Yang,2014-12-27 This timely review volume summarizes the state of the art developments in nature inspired algorithms and applications with the emphasis on swarm intelligence and bio inspired computation Topics include the analysis and overview of swarm intelligence and evolutionary computation hybrid metaheuristic algorithms bat algorithm discrete cuckoo search firefly algorithm particle swarm optimization and harmony search as well as convergent hybridization Application case studies have focused on the dehydration of fruits and vegetables by the firefly algorithm and goal programming feature selection by the binary flower pollination algorithm job shop scheduling single row facility layout optimization training of feed forward neural networks damage and stiffness identification synthesis of cross ambiguity functions by the bat algorithm web document clustering truss analysis water distribution networks sustainable building designs and others As a timely review this book can serve as

an ideal reference for graduates lecturers engineers and researchers in computer science evolutionary computing artificial intelligence machine learning computational intelligence data mining engineering optimization and designs Computing for Hybrid Intelligent Systems Oscar Castillo, Patricia Melin, Witold Pedrycz, 2008-08-25 We describe in this book new methods and applications of hybrid intelligent systems using soft computing techniques Soft Computing SC consists of several intelligent computing paradigms including fuzzy logic neural networks and evolutionary al rithms which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts which contain a group of papers around a similar subject The first part consists of papers with the main theme of intelligent control which are basically papers that use hybrid systems to solve particular problems of control The second part contains papers with the main theme of pattern recognition which are basically papers using soft computing techniques for achieving pattern recognition in different applications. The third part contains papers with the themes of intelligent agents and social systems which are papers that apply the ideas of agents and social behavior to solve real world problems. The fourth part contains papers that deal with the hardware implementation of intelligent systems for solving particular problems The fifth part contains papers that deal with modeling simulation and optimization for real world applications Recent Advances on Memetic Algorithms and its Applications in Image Processing D. Jude Hemanth, B. Vinoth Kumar, G. R. Karpagam Manavalan, 2019-12-07 This book includes original research findings in the field of memetic algorithms for image processing applications It gathers contributions on theory case studies and design methods pertaining to memetic algorithms for image processing applications ranging from defence medical image processing and surveillance to computer vision robotics etc The content presented here provides new directions for future research from both theoretical and practical viewpoints and will spur further advances in the field Intuitionistic and Type-2 Fuzzy Logic Enhancements in Neural and Optimization Algorithms: Theory and Applications Oscar Castillo, Patricia Melin, Janusz Kacprzyk, 2020-02-27 This book describes the latest advances in fuzzy logic neural networks and optimization algorithms as well as their hybrid intelligent combinations and their applications in the areas such as intelligent control robotics pattern recognition medical diagnosis time series prediction and optimization The topic is highly relevant as most current intelligent systems and devices use some form of intelligent feature to enhance their performance The book also presents new and advanced models and algorithms of type 2 fuzzy logic and intuitionistic fuzzy systems which are of great interest to researchers in these areas Further it proposes novel nature inspired optimization algorithms and innovative neural models Featuring contributions on theoretical aspects as well as applications Recent Advances in Computational Optimization Stefka Fidanova, 2018-09-18 Our the book appeals to a wide audience everyday lives are practically unthinkable without optimization We constantly try to minimize our effort and to maximize the reward or progress achieved Many real world and industrial problems arising in engineering economics medicine and other domains can be formulated as optimization tasks This volume presents a comprehensive collection of extended contributions

from the 2017 Workshop on Computational Optimization Presenting recent advances in computational optimization it addresses important concrete applications e g the modeling of physical processes wildfire modeling modeling processes in chemical engineering workforce planning wireless access network topology parameter settings for controlling various processes berth allocation identification of homogeneous domains and quantum computing The book shows how to develop algorithms for them based on new intelligent methods like evolutionary computations ant colony optimization constrain programming and others Hybrid Intelligent Systems Larry R. Medsker, 2012-12-06 Hybrid Intelligent Systems summarizes the strengths and weaknesses of five intelligent technologies fuzzy logic genetic algorithms case based reasoning neural networks and expert systems reviewing the status and significance of research into their integration Engineering and scientific examples and case studies are used to illustrate principles and application development techniques The reader will gain a clear idea of the current status of hybrid intelligent systems and discover how to choose and develop appropriate applications. The book is based on a thorough literature search of recent publications on research and development in hybrid intelligent systems the resulting 50 page reference section of the book is invaluable The book starts with a summary of the five major intelligent technologies and of the issues in and current status of research into them Each subsequent chapter presents a detailed discussion of a different combination of intelligent technologies along with examples and case studies Four chapters contain detailed case studies of working hybrid systems The book enables the reader to Describe the important concepts strengths and limitations of each technology Recognize and analyze potential problems with the application of hybrid systems Choose appropriate hybrid intelligent solutions Understand how applications are designed with any of the approaches covered Choose appropriate commercial development shells or tools An invaluable reference source for those who wish to apply intelligent systems techniques to their own problems Recent Advances on Hybrid Approaches for Designing Intelligent Systems Oscar Castillo, Patricia Melin, Witold Pedrycz, Janusz Kacprzyk, 2014-03-26 This book describes 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 in 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 2 fuzzy logic which basically consists of papers 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 papers using nature inspired techniques to achieve optimization of complex optimization problems in diverse areas of application The third part contains papers that deal with new models and applications of neural networks in real world problems The fourth part contains papers 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 papers with the theme of evolutionary methods and intelligent computing which are papers considering soft computing methods for applications related to diverse areas such as natural language processing recommending systems and optimization

Nature-Inspired Design of Hybrid Intelligent Systems Patricia Melin, Oscar Castillo, Janusz Kacprzyk, 2016-12-08 This book highlights recent advances in the design of hybrid intelligent systems based on nature inspired optimization and their application in areas such as intelligent control and robotics pattern recognition time series prediction and optimization of complex problems The book is divided into seven main parts the first of which addresses theoretical aspects of and new concepts and algorithms based on type 2 and intuitionistic fuzzy logic systems. The second part focuses on neural network theory and explores the applications of neural networks in diverse areas such as time series prediction and pattern recognition The book s third part presents enhancements to meta heuristics based on fuzzy logic techniques and describes new nature inspired optimization algorithms that employ fuzzy dynamic adaptation of parameters while the fourth part presents diverse applications of nature inspired optimization algorithms In turn the fifth part investigates applications of fuzzy logic in diverse areas such as time series prediction and pattern recognition. The sixth part examines new optimization algorithms and their applications Lastly the seventh part is dedicated to the design and application of different hybrid Modern Artificial Intelligence Based on Soft Computing Techniques Patricia Melin, Oscar intelligent systems Castillo, 2025-07-05 This book describes what we can call modern artificial intelligence that includes the theoretical developments and applications of soft computing techniques Soft computing includes fuzzy logic neural networks and meta heuristic algorithms as well as their hybrid combinations. There are papers with the main topics from type 1 to type 3 fuzzy logic which basically consists of a group of papers that propose new concepts and algorithms based on type 1 type 2 and type 3 fuzzy logic and their applications There are also papers that present theory and practice of meta heuristics in diverse application areas There are interesting papers on different applications of fuzzy logic neural networks and hybrid intelligent systems in medical problems In addition we can find papers describing applications of fuzzy logic neural networks and meta Recent Advances in Computer Vision Applications Using Parallel Processing Khalid M. heuristics in robotics problems Hosny, Ahmad Salah, 2023-01-23 This comprehensive book is primarily intended for researchers computer vision specialists and high performance computing specialists who are interested in parallelizing computer vision techniques for the sake of accelerating the run time of computer vision methods This book covers different penalization methods on different parallel architectures such as multi core CPUs and GPUs It is also a valuable reference resource for researchers at all levels e.g. undergraduate and postgraduate who are seeking real life examples of speeding up the computer vision methods run time

<u>Computational Intelligence for Business Analytics</u> Witold Pedrycz, Luis Martínez, Rafael Alejandro Espin-Andrade, Gilberto Rivera, Jorge Marx Gómez, 2021-10-26 Corporate success has been changed by the importance of new developments in

Business Analytics BA and furthermore by the support of computational intelligence based techniques This book opens a new avenues in these subjects identifies key developments and opportunities. The book will be of interest for students researchers and professionals to identify innovative ways delivered by Business Analytics based on computational intelligence solutions They help elicit information handle knowledge and support decision making for more informed and reliable decisions even under high uncertainty environments Computational Intelligence for Business Analytics has collected the latest technological innovations in the field of BA to improve business models related to Group Decision Making Forecasting Risk Management Knowledge Discovery Data Breach Detection Social Well Being among other key topics related to this field Horizons for Fuzzy Logic, Neural Networks and Metaheuristics Oscar Castillo, Patricia Melin, 2024-05-21 This book contains a collection of papers focused on hybrid intelligent systems based on soft computing techniques In this book new horizons on the theoretical developments of fuzzy logic neural networks and optimization algorithms are envisioned In addition the abovementioned methods are discussed in application areas such as control and robotics pattern recognition medical diagnosis decision making prediction and optimization of complex problems There are a group of papers with the main theme of type 1 type 2 and type 3 fuzzy systems which basically consists of papers that propose new concepts and algorithms based on type 1 type 2 and type 3 fuzzy logic and their applications. There is also a group of papers that offer theoretical concepts and applications of meta heuristics in different areas Another group of papers outlines diverse applications of hybrid intelligent systems in real problems There are also a group papers that present theory and practice of neural networks in different applications Finally there are papers that offer theory and practice of optimization and evolutionary algorithms in different application areas Recent Advances in Computer Vision Mahmoud Hassaballah, Khalid M. Hosny, 2018-12-14 This book presents a collection of high quality research by leading experts in computer vision and its applications Each of the 16 chapters can be read independently and discusses the principles of a specific topic reviews up to date techniques presents outcomes and highlights the challenges and future directions As such the book explores the latest trends in fashion creative processes facial features detection visual odometry transfer learning face recognition feature description plankton and scene classification video face alignment video searching and object segmentation It is intended for postgraduate students researchers scholars and developers who are interested in computer vision and connected research disciplines and is also suitable for senior undergraduate students who are taking advanced courses in related topics However it is also provides a valuable reference resource for practitioners from industry who want to keep abreast of recent developments in this dynamic exciting and profitable research field Recent Advances in Computational Intelligence and Cyber Security Ashok Kumar Singh, Zeeshan Ali Siddiqui, Siddharth Singh, Amit Kumar Singh, Tanveer J. Siddiqui, 2024-07-08 In the ever accelerating tapestry of our digital age the symbiotic relationship between computational intelligence and cyber security has become the linchpin of progress The relentless pace of technological evolution and the

ceaseless emergence of cyber threats demand not only adaptation but also an exploration of the forefronts of innovation and defence Recent Advances in Computational Intelligence and Cyber security is a testament to the exhilarating journey undertaken by researchers practitioners and visionaries in these pivotal fields Within the confines of this book we embark on a captivating exploration of the cutting edge developments that define the current state of computational intelligence and the intricate dance with the ever evolving landscape of cyber security Design of Intelligent Systems Based on Fuzzy Logic, Neural Networks and Nature-Inspired Optimization Patricia Melin, Oscar Castillo, Janusz Kacprzyk, 2015-06-12 This book presents recent advances on the design of intelligent systems based on fuzzy logic neural networks and nature inspired optimization and their application in areas such as intelligent control and robotics pattern recognition time series prediction and optimization of complex problems. The book is organized in eight main parts which contain a group of papers around a similar subject The first part consists of papers with the main theme of theoretical aspects of fuzzy logic which basically consists of papers that propose new concepts and algorithms based on fuzzy systems. The second part contains papers with the main theme of neural networks theory which are basically papers dealing with new concepts and algorithms in neural networks The third part contains papers describing applications of neural networks in diverse areas such as time series prediction and pattern recognition. The fourth part contains papers describing new nature inspired optimization algorithms The fifth part presents diverse applications of nature inspired optimization algorithms. The sixth part contains papers describing new optimization algorithms. The seventh part contains papers describing applications of fuzzy logic in diverse areas such as time series prediction and pattern recognition Finally the eighth part contains papers that present enhancements to meta heuristics based on fuzzy logic techniques Recent Advances in Agent-based Complex Automated Negotiation Naoki Fukuta, Takayuki Ito, Minjie Zhang, Katsuhide Fujita, Valentin Robu, 2016-03-24 This book covers recent advances in Complex Automated Negotiations as a widely studied emerging area in the field of Autonomous Agents and Multi Agent Systems The book includes selected revised and extended papers from the 7th International Workshop on Agent Based Complex Automated Negotiation ACAN2014 which was held in Paris France in May 2014 The book also includes brief introductions about Agent based Complex Automated Negotiation which are based on tutorials provided in the workshop and brief summaries and descriptions about the ANAC 14 Automated Negotiating Agents Competition competition where authors of selected finalist agents explain the strategies and the ideas used by them The book is targeted to academic and industrial researchers in various communities of autonomous agents and multi agent systems such as agreement technology mechanism design electronic commerce related areas as well as graduate undergraduate and PhD students working in those areas or having interest in them Novel Developments in Uncertainty Representation and Processing Krassimir T. Atanassov, Oscar Castillo, Janusz Kacprzyk, Maciej Krawczak, Patricia Melin, Sotir Sotirov, Evdokia Sotirova, Eulalia Szmidt, Guy De Tré, Sławomir Zadrożny, 2015-10-23 This volume contains first of all the papers presented at the Fourteenth International

Workshop on Intuitionistic Fuzzy Sets and Generalized Nets IWIFSGN 2015 held on October 26 28 2015 in Cracow Poland Moreover the volume contains some papers of a particular relevance not presented at the Workshop The Workshop is mainly devoted to the presentation of recent research results in the broadly perceived fields of intuitionistic fuzzy sets and generalized nets initiated by Professor Krassimir T Atanassov whose constant inspiration and support is crucial for such a widespread growing popularity and recognition of these areas The Workshop is a next edition of a series of the IWIFSGN Workshops organized for years by the Systems Research Institute Polish Academy of Sciences Warsaw Poland Institute of Biophysics and Biomedical Engineering Bulgarian Academy of Sciences Sofia Bulgaria and WIT Warsaw School of Information Technology Warsaw Poland and co organized by Matej Bel University Banska Bystrica Slovakia Universidad Publica de Navarra Pamplona Spain Universidade de Tras Os Montes e Alto Douro Vila Real Portugal Prof Asen Zlatarov University Burgas Bulgaria Complutense University Madrid Spain and the University of Westminster Harrow UK Recent Advances in Intelligent Paradigms and Applications Ajith Abraham, 2013-03-20 Digital systems that bring together the computing capacity for processing large bodies of information with the human cognitive capability are called intelligent systems Building these systems has become one of the great goals of modem technology This goal has both intellectual and economic incentives The need for such intelligent systems has become more intense in the face of the global connectivity of the internet There has become an almost insatiable requirement for instantaneous information and decision brought about by this confluence of computing and communication This requirement can only be satisfied by the construction of innovative intelligent systems A second and perhaps an even more significant development is the great advances being made in genetics and related areas of biotechnology Future developments in biotechnology may open the possibility for the development of a true human silicon interaction at the micro level neural and cellular bringing about a need for intelligent systems What is needed to further the development of intelligent systems are tools to enable the representation of human cognition in a manner that allows formal manipulation The idea of developing such an algebra goes back to Leibniz in the 17th century with his dream of a calculus ratiocinator It wasn t until two hundred years later beginning with the work of Boole Cantor and Frege that a formal mathematical logic for modeling human reasoning was developed. The introduction of the modem digital computer during the Second World War by von Neumann and others was a culmination of this intellectual trend

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Table of Contents Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence

- 1. Understanding the eBook Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - The Rise of Digital Reading Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Advantages of eBooks Over Traditional Books
- 2. Identifying Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
- 3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - User-Friendly Interface
- 4. Exploring eBook Recommendations from Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Personalized Recommendations
 - Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence User Reviews and Ratings
 - $\circ \ \ Recent\ Advances\ On\ Hybrid\ Intelligent\ Systems\ Studies\ In\ Computational\ Intelligence\ and\ Bestseller\ Lists$
- 5. Accessing Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence Free and Paid eBooks
 - Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence Public Domain eBooks

- Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence eBook Subscription Services
- Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence Budget-Friendly Options
- 6. Navigating Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence eBook Formats
 - o ePub, PDF, MOBI, and More
 - Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence Compatibility with Devices
 - Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Highlighting and Note-Taking Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Interactive Elements Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
- 8. Staying Engaged with Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
- 9. Balancing eBooks and Physical Books Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - $\circ\,$ Benefits of a Digital Library
 - Creating a Diverse Reading Collection Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Setting Reading Goals Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Carving Out Dedicated Reading Time

- 12. Sourcing Reliable Information of Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Fact-Checking eBook Content of Recent Advances On Hybrid Intelligent Systems Studies In Computational Intelligence
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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