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Carlos Cotta
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Handbook of Memetic Algorithms

Springer

Handbook Of Memetic Algorithms Studies In Computational Intelligence

Emilie Sanchez

Handbook Of Memetic Algorithms Studies In Computational Intelligence:

Springer Handbook of Computational Intelligence Janusz Kacprzyk,Witold Pedrycz,2015-05-28 The Springer Handbook for Computational Intelligence is the first book covering the basics the state of the art and important applications of the dynamic and rapidly expanding discipline of computational intelligence This comprehensive handbook makes readers familiar with a broad spectrum of approaches to solve various problems in science and technology Possible approaches include for example those being inspired by biology living organisms and animate systems Content is organized in seven parts foundations fuzzy logic rough sets evolutionary computation neural networks swarm intelligence and hybrid computational intelligence systems Each Part is supervised by its own Part Editor s so that high quality content as well as completeness are assured   **Handbook of Memetic Algorithms** Ferrante Neri,Carlos Cotta,Pablo Moscato,2011-10-29 Memetic Algorithms MAs are computational intelligence structures combining multiple and various operators in order to address optimization problems The combination and interaction amongst operators evolves and promotes the diffusion of the most successful units and generates an algorithmic behavior which can handle complex objective functions and hard fitness landscapes Handbook of Memetic Algorithms organizes in a structured way all the the most important results in the field of MAs since their earliest definition until now A broad review including various algorithmic solutions as well as successful applications is included in this book Each class of optimization problems such as constrained optimization multi objective optimization continuous vs combinatorial problems uncertainties are analysed separately and for each problem memetic recipes for tackling the difficulties are given with some successful examples Although this book contains chapters written by multiple authors a great attention has been given by the editors to make it a compact and smooth work which covers all the main areas of computational intelligence optimization It is not only a necessary read for researchers working in the research area but also a useful handbook for practitioners and engineers who need to address real world optimization problems In addition the book structure makes it an interesting work also for graduate students and researchers is related fields of mathematics and computer science   Handbook of Metaheuristics Michel Gendreau,Jean-Yves Potvin,2018-09-20 The third edition of this handbook is designed to provide a broad coverage of the concepts implementations and applications in metaheuristics The book s chapters serve as stand alone presentations giving both the necessary underpinnings as well as practical guides for implementation The nature of metaheuristics invites an analyst to modify basic methods in response to problem characteristics past experiences and personal preferences and the chapters in this handbook are designed to facilitate this process as well This new edition has been fully revised and features new chapters on swarm intelligence and automated design of metaheuristics from flexible algorithm frameworks The authors who have contributed to this volume represent leading figures from the metaheuristic community and are responsible for pioneering contributions to the fields they write about Their collective work has significantly enriched the field of optimization in general and combinatorial optimization in

particular Metaheuristics are solution methods that orchestrate an interaction between local improvement procedures and higher level strategies to create a process capable of escaping from local optima and performing a robust search of a solution space In addition many new and exciting developments and extensions have been observed in the last few years Hybrids of metaheuristicss with other optimization techniques like branch and bound mathematical programming or constraint programming are also increasingly popular On the front of applications metaheuristics are now used to find high quality solutions to an ever growing number of complex ill defined real world problems in particular combinatorial ones This handbook should continue to be a great reference for researchers graduate students as well as practitioners interested in metaheuristics **Proceedings of the Future Technologies Conference (FTC) 2018** Kohei Arai,Rahul Bhatia,Supriya Kapoor,2018-10-19 The book presenting the proceedings of the 2018 Future Technologies Conference FTC 2018 is a remarkable collection of chapters covering a wide range of topics including but not limited to computing electronics artificial intelligence robotics security and communications and their real world applications The conference attracted a total of 503 submissions from pioneering researchers scientists industrial engineers and students from all over the world After a double blind peer review process 173 submissions including 6 poster papers have been selected to be included in these proceedings FTC 2018 successfully brought together technology geniuses in one venue to not only present breakthrough research in future technologies but to also promote practicality and applications and an intra and inter field exchange of ideas In the future computing technologies will play a very important role in the convergence of computing communication and all other computational sciences and applications And as a result it will also influence the future of science engineering industry business law politics culture and medicine Providing state of the art intelligent methods and techniques for solving real world problems as well as a vision of the future research this book is a valuable resource for all those interested in this area

Computational Intelligence - Volume II Hisao Ishibuchi,2015-12-30 Computational intelligence is a component of Encyclopedia of Technology Information and Systems Management Resources in the global Encyclopedia of Life Support Systems EOLSS which is an integrated compendium of twenty one Encyclopedias Computational intelligence is a rapidly growing research field including a wide variety of problem solving techniques inspired by nature Traditionally computational intelligence consists of three major research areas Neural Networks Fuzzy Systems and Evolutionary Computation Neural networks are mathematical models inspired by brains Neural networks have massively parallel network structures with many neurons and weighted connections Whereas each neuron has a simple input output relation a neural network with many neurons can realize a highly non linear complicated mapping Connection weights between neurons can be adjusted in an automated manner by a learning algorithm to realize a non linear mapping required in a particular application task Fuzzy systems are mathematical models proposed to handle inherent fuzziness in natural language For example it is very difficult to mathematically define the meaning of cold in everyday conversations such as It is cold today and Can I have cold water The

meaning of cold may be different in a different situation Even in the same situation a different person may have a different meaning Fuzzy systems offer a mathematical mechanism to handle inherent fuzziness in natural language As a result fuzzy systems have been successfully applied to real world problems by extracting linguistic knowledge from human experts in the form of fuzzy IF THEN rules Evolutionary computation includes various population based search algorithms inspired by evolution in nature Those algorithms usually have the following three mechanisms fitness evaluation to measure the quality of each solution selection to choose good solutions from the current population and variation operators to generate offspring from parents Evolutionary computation has high applicability to a wide range of optimization problems with different characteristics since it does not need any explicit mathematical formulations of objective functions For example simulation based fitness evaluation is often used in evolutionary design Subjective fitness evaluation by a human user is also often used in evolutionary art and music These volumes are aimed at the following five major target audiences University and College students Educators Professional practitioners Research personnel and Policy analysts managers and decision makers

Evolutionary and Swarm Intelligence Algorithms Jagdish Chand Bansal,Pramod Kumar Singh,Nikhil R. Pal,2018-06-06 This book is a delight for academics researchers and professionals working in evolutionary and swarm computing computational intelligence machine learning and engineering design as well as search and optimization in general It provides an introduction to the design and development of a number of popular and recent swarm and evolutionary algorithms with a focus on their applications in engineering problems in diverse domains The topics discussed include particle swarm optimization the artificial bee colony algorithm Spider Monkey optimization algorithm genetic algorithms constrained multi objective evolutionary algorithms genetic programming and evolutionary fuzzy systems A friendly and informative treatment of the topics makes this book an ideal reference for beginners and those with experience alike

Optinformatics in Evolutionary Learning and Optimization Liang Feng,Yaqing Hou,Zexuan Zhu,2021-03-29 This book provides readers the recent algorithmic advances towards realizing the notion of optinformatics in evolutionary learning and optimization The book also provides readers a variety of practical applications including inter domain learning in vehicle route planning data driven techniques for feature engineering in automated machine learning as well as evolutionary transfer reinforcement learning Through reading this book the readers will understand the concept of optinformatics recent research progresses in this direction as well as particular algorithm designs and application of optinformatics Evolutionary algorithms EAs are adaptive search approaches that take inspiration from the principles of natural selection and genetics Due to their efficacy of global search and ease of usage EAs have been widely deployed to address complex optimization problems occurring in a plethora of real world domains including image processing automation of machine learning neural architecture search urban logistics planning etc Despite the success enjoyed by EAs it is worth noting that most existing EA optimizers conduct the evolutionary search process from scratch ignoring the data that may

have been accumulated from different problems solved in the past However today it is well established that real world problems seldom exist in isolation such that harnessing the available data from related problems could yield useful information for more efficient problem solving Therefore in recent years there is an increasing research trend in conducting knowledge learning and data processing along the course of an optimization process with the goal of achieving accelerated search in conjunction with better solution quality To this end the term optinformatics has been coined in the literature as the incorporation of information processing and data mining i e informatics techniques into the optimization process The primary market of this book is researchers from both academia and industry who are working on computational intelligence methods and their applications This book is also written to be used as a textbook for a postgraduate course in computational intelligence emphasizing methodologies at the intersection of optimization and machine learning **Numerical Methods and Applications** Ivan Dimov,Stefka Fidanova,Ivan Lirkov,2015-02-03 This book constitutes the thoroughly refereed post conference proceedings of the 8th International Conference on Numerical Methods and Applications NMA 2014 held in Borovets Bulgaria in August 2014 The 34 revised full papers presented were carefully reviewed and selected from 56 submissions for inclusion in this book The papers are organized in the following topical sections Monte Carlo and quasi Monte Carlo methods metaheuristics for optimization problems advanced numerical methods for scientific computing advanced numerical techniques for PDEs and applications solving large engineering and scientific problems with advanced mathematical models numerical simulations and back analysis in civil and mechanical engineering **Computer Aided Systems Theory – EUROCAST 2017** Roberto Moreno-Díaz,Franz Pichler,Alexis Quesada-Arencibia,2018-01-25 The two volume set LNCS 10671 and 10672 constitutes the thoroughly refereed proceedings of the 16th International Conference on Computer Aided Systems Theory EUROCAST 2017 held in Las Palmas de Gran Canaria Spain in February 2017 The 117 full papers presented were carefully reviewed and selected from 160 submissions The papers are organized in topical sections on pioneers and landmarks in the development of information and communication technologies systems theory socio economic systems and applications theory and applications of metaheuristic algorithms stochastic models and applications to natural social and technical systems model based system design verification and simulation applications of signal processing technology algebraic and combinatorial methods in signal and pattern analysis computer vision deep learning and applications computer and systems based methods and electronics technologies in medicine intelligent transportation systems and smart mobility **Advances in Swarm Intelligence** Ying Tan,Yuhui Shi,Ben Niu,2016-09-05 This two volume set LNCS 9712 and LNCS 9713 constitutes the refereed proceedings of the 7th International Conference on Swarm Intelligence ICSI 2016 held in Bali Indonesia in June 2016 The 130 revised regular papers presented were carefully reviewed and selected from 231 submissions The papers are organized in 22 cohesive sections covering major topics of swarm intelligence and related areas such as trend and models of swarm intelligence research novel swarm based optimization algorithms

swarming behaviour some swarm intelligence algorithms and their applications hybrid search optimization particle swarm optimization PSO applications ant colony optimization brain storm optimization fireworks algorithms multi objective optimization large scale global optimization biometrics scheduling and planning machine learning methods clustering algorithm classification image classification and encryption data mining sensor networks and social networks neural networks swarm intelligence in management decision making and operations research robot control swarm robotics intelligent energy and communications systems and intelligent and interactive and tutoring systems **A Guided Tour of Artificial Intelligence Research** Pierre Marquis,Odile Papini,Henri Prade,2020-05-08 The purpose of this book is to provide an overview of AI research ranging from basic work to interfaces and applications with as much emphasis on results as on current issues It is aimed at an audience of master students and Ph D students and can be of interest as well for researchers and engineers who want to know more about AI The book is split into three volumes the first volume brings together twenty three chapters dealing with the foundations of knowledge representation and the formalization of reasoning and learning Volume 1 Knowledge representation reasoning and learning the second volume offers a view of AI in fourteen chapters from the side of the algorithms Volume 2 AI Algorithms the third volume composed of sixteen chapters describes the main interfaces and applications of AI Volume 3 Interfaces and applications of AI This second volume presents the main families of algorithms developed or used in AI to learn to infer to decide Generic approaches to problem solving are presented ordered heuristic search as well as metaheuristics are considered Algorithms for processing logic based representations of various types first order formulae propositional formulae logic programs etc and graphical models of various types standard constraint networks valued ones Bayes nets Markov random fields etc are presented The volume also focuses on algorithms which have been developed to simulate specific intelligent processes such as planning playing learning and extracting knowledge from data Finally an afterword draws a parallel between algorithmic problems in operation research and in AI **Intelligent Information and Database Systems** Ngoc Thanh Nguyen,Ford Lumban Gaol,Tzung-Pei Hong,Bogdan Trawiński,2019-04-02 The two volume set LNAI 11431 and 11432 constitutes the refereed proceedings of the 11th Asian Conference on Intelligent Information and Database Systems ACIIDS 2019 held in Yogyakarta Indonesia in April 2019 The total of 124 full papers accepted for publication in these proceedings were carefully reviewed and selected from 309 submissions The papers of the first volume are organized in the following topical sections knowledge engineering and semantic web text processing and information retrieval machine learning and data mining decision support and control systems computer vision techniques and databases and intelligent information systems The papers of the second volume are divided into these topical sections collective intelligence for service innovation technology management E learning and fuzzy intelligent systems data structures modelling for knowledge representation advanced data mining techniques and applications intelligent information systems intelligent methods and artificial intelligence for biomedical decision support

systems intelligent and contextual systems intelligent systems and algorithms in information sciences intelligent supply chains and e commerce sensor networks and Internet of Things analysis of image video movements and brain intelligence in life sciences and computer vision and intelligent systems **Business and Consumer Analytics: New Ideas** Pablo Moscato,Natalie Jane de Vries,2019-05-30 This two volume handbook presents a collection of novel methodologies with applications and illustrative examples in the areas of data driven computational social sciences Throughout this handbook the focus is kept specifically on business and consumer oriented applications with interesting sections ranging from clustering and network analysis meta analytics memetic algorithms machine learning recommender systems methodologies parallel pattern mining and data mining to specific applications in market segmentation travel fashion or entertainment analytics A must read for anyone in data analytics marketing behavior modelling and computational social science interested in the latest applications of new computer science methodologies The chapters are contributed by leading experts in the associated fields The chapters cover technical aspects at different levels some of which are introductory and could be used for teaching Some chapters aim at building a commonunderstanding of the methodologies and recent application areas including the introduction of new theoretical results in the complexity of core problems Business and marketing professionals may use the book to familiarize themselves with some important foundations of data science The work is a good starting point to establish an open dialogue of communication between professionals and researchers from different fields Together the two volumes present a number of different new directions in Business and Customer Analytics with an emphasis in personalization of services the development of new mathematical models and new algorithms heuristics and metaheuristics applied to the challenging problems in the field Sections of the book have introductory material to more specific and advanced themes in some of the chapters allowing the volumes to be used as an advanced textbook Clustering Proximity Graphs Pattern Mining Frequent Itemset Mining Feature Engineering Network and Community Detection Network based Recommending Systems and Visualization are some of the topics in the first volume Techniques on Memetic Algorithms and their applications to Business Analytics and Data Science are surveyed in the second volume applications in Team Orienteering Competitive Facility location and Visualization of Products and Consumers are also discussed The second volume also includes an introduction to Meta Analytics and to the application areas of Fashion and Travel Analytics Overall the two volume set helps to describe some fundamentals acts as a bridge between different disciplines and presents important results in a rapidly moving field combining powerful optimization techniques allied to new mathematical models critical for personalization of services Academics and professionals working in the area of business anyalytics data science operations research and marketing will find this handbook valuable as a reference Students studying these fields will find this handbook useful and helpful as a secondary textbook *Artificial Evolution* Lhassane Idoumghar,Pierrick Legrand,Arnaud Liefooghe,Evelyne Lutton,Nicolas Monmarché,Marc Schoenauer,2020-04-29 This book constitutes the thoroughly refereed post conference

proceedings of the 14th International Conference on Artificial Evolution EA 2019 held in Mulhouse France in October 2019 The 16 revised papers were carefully reviewed and selected from 33 submissions The papers cover a wide range of topics in the field of artificial evolution such as evolutionary computation evolutionary optimization co evolution artificial life population dynamics theory algorithmic and modeling implementations application of evolutionary paradigms to the real world industry biosciences other biologically inspired paradigms swarm artificial ants artificial immune systems cultural algorithms memetic algorithms multi objective optimization constraint handling parallel algorithms dynamic optimization machine learning and hybridization with other soft computing techniques *Advances in Artificial Life, Evolutionary Computation and Systems Chemistry* Federico Rossi,Fabio Mavelli,Pasquale Stano,Danilo Caivano,2016-04-02 This book constitutes the revised selected papers of the 10th Italian Workshop on Advances in Artificial Life Evolutionary Computation and Systems Chemistry WIVACE 2015 held at Bari Italy in September 2015 The 18 papers presented have been thoroughly reviewed and selected from 45 submissions They cover the following topics evolutionary computation bioinspired algorithms genetic algorithms bioinformatics and computational biology modeling and simulation of artificial and biological systems complex systems synthetic and systems biology systems chemistry **Self-organizing Coalitions for Managing Complexity** Juan C. Burguillo,2017-12-13 This book provides an interdisciplinary approach to complexity combining ideas from areas like complex networks cellular automata multi agent systems self organization and game theory The first part of the book provides an extensive introduction to these areas while the second explores a range of research scenarios Lastly the book presents CellNet a software framework that offers a hands on approach to the scenarios described throughout the book In light of the introductory chapters the research chapters and the CellNet simulating framework this book can be used to teach undergraduate and master s students in disciplines like artificial intelligence computer science applied mathematics economics and engineering Moreover the book will be particularly interesting for Ph D and postdoctoral researchers seeking a general perspective on how to design and create their own models Computational Intelligence Juan Julian Merelo,Agostinho Rosa,José M. Cadenas,António Dourado,Kurosh Madani,Joaquim Filipe,2015-11-30 The present book includes a set of selected extended papers from the sixth International Joint Conference on Computational Intelligence IJCCI 2014 held in Rome Italy from 22 to 24 October 2014 The conference was composed by three co located conferences The International Conference on Evolutionary Computation Theory and Applications ECTA the International Conference on Fuzzy Computation Theory and Applications FCTA and the International Conference on Neural Computation Theory and Applications NCTA Recent progresses in scientific developments and applications in these three areas are reported in this book IJCCI received 210 submissions from 51 countries in all continents After a double blind paper review performed by the Program Committee 15% were accepted as full papers and thus selected for oral presentation Additional papers were accepted as short papers and posters A further selection was made after the Conference based also on the assessment of

presentation quality and audience interest so that this book includes the extended and revised versions of the very best papers of IJCCI 2014 Commitment to high quality standards is a major concern of IJCCI that will be maintained in the next editions considering not only the stringent paper acceptance ratios but also the quality of the program committee keynote lectures participation level and logistics *Large-Scale Scientific Computing* Ivan Lirkov,Svetozar D. Margenov,Jerzy Waśniewski,2015-11-29 This book constitutes the thoroughly refereed post conference proceedings of the 10th International Conference on Large Scale Scientific Computations LSSC 2015 held in Sozopol Bulgaria in June 2015 The 49 revised full papers presented were carefully reviewed and selected from 64 submissions The general theme for LSSC 2015 was Large Scale Scientific Computing with a particular focus on the organized special sessions enabling exascale computation control and uncertain systems computational microelectronics from monte carlo to deterministic approaches numerical methods for multiphysics problems large scale models numerical methods parallel computations and applications mathematical modeling and analysis of PDEs describing physical problems a posteriori error control and iterative methods for maxwell type problems efficient algorithms for hybrid HPC systems multilevel methods on graphs and applications of metaheuristics to large scale problems *Toward Connected, Cooperative and Intelligent IoV* Kai Liu,Penglin Dai,Victor C.S. Lee,Joseph Kee-Yin Ng,Sang Hyuk Son,2024-03-14 This book offers a comprehensive introduction to technological advances in Internet of Vehicles IoV including vehicular communications vehicular system architectures data dissemination algorithms resource allocation schemes and AI enabled applications It focuses on the state of the art IoV with regard to three major directions namely networking cooperation and intelligence including advanced wireless communication technologies algorithm theory optimization mechanisms and AI technologies In addition the book includes a number of case studies with system prototype implementation and hands on experiments in IoV making it suitable both as a technical reference work for professionals and as a textbook for graduate students **Microarray Image and Data Analysis** Luis Rueda,2018-09-03 Microarray Image and Data Analysis Theory and Practice is a compilation of the latest and greatest microarray image and data analysis methods from the multidisciplinary international research community Delivering a detailed discussion of the biological aspects and applications of microarrays the book Describes the key stages of image processing gridding segmentation compression quantification and normalization Features cutting edge approaches to clustering biclustering and the reconstruction of regulatory networks Covers different types of microarrays such as DNA protein tissue and low and high density oligonucleotide arrays Examines the current state of various microarray technologies including their availability and affordability Explains how data generated by microarray experiments are analyzed to obtain meaningful biological conclusions An essential reference for academia and industry Microarray Image and Data Analysis Theory and Practice provides readers with valuable tools and techniques that extend to a wide range of biological studies and microarray platforms

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