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# **Advances in Multi-Objective Nature Inspired Computing**



Springer

# Advances In Multi Objective Nature Inspired Computing

**Ying Tan, Yuhui Shi, Milan Tuba**



## **Advances In Multi Objective Nature Inspired Computing:**

**Advances in Multi-Objective Nature Inspired Computing** Carlos Coello Coello,Clarisse Dhaenens,Laetitia Jourdan,2010-02-04 The purpose of this book is to collect contributions that deal with the use of nature inspired metaheuristics for solving multi objective combinatorial optimization problems Such a collection intends to provide an overview of the state of the art developments in this field with the aim of motivating more researchers in operations research engineering and computer science to do research in this area As such this book is expected to become a valuable reference for those wishing to do research on the use of nature inspired metaheuristics for solving multi objective combinatorial optimization problems *Advances in Multi-Objective Nature Inspired Computing* Carlos Coello Coello,Clarisse Dhaenens,Laetitia Jourdan,2010 The purpose of this book is to collect contributions that deal with the use of nature inspired metaheuristics for solving multi objective combinatorial optimization problems Such a collection intends to provide an overview of the state of the art developments in this field with the aim of motivating more researchers in operations research engineering and computer science to do research in this area As such this book is expected to become a valuable reference for those wishing to do research on the use of nature inspired metaheuristics for solving multi objective combinatorial optimization problems **Metaheuristics for Big Data** Clarisse Dhaenens,Laetitia Jourdan,2016-08-29 Big Data is a new field with many technological challenges to be understood in order to use it to its full potential These challenges arise at all stages of working with Big Data beginning with data generation and acquisition The storage and management phase presents two critical challenges infrastructure for storage and transportation and conceptual models Finally to extract meaning from Big Data requires complex analysis Here the authors propose using metaheuristics as a solution to these challenges they are first able to deal with large size problems and secondly flexible and therefore easily adaptable to different types of data and different contexts The use of metaheuristics to overcome some of these data mining challenges is introduced and justified in the first part of the book alongside a specific protocol for the performance evaluation of algorithms An introduction to metaheuristics follows The second part of the book details a number of data mining tasks including clustering association rules supervised classification and feature selection before explaining how metaheuristics can be used to deal with them This book is designed to be self contained so that readers can understand all of the concepts discussed within it and to provide an overview of recent applications of metaheuristics to knowledge discovery problems in the context of Big Data Recent Developments in Metaheuristics Lionel Amodeo,El-Ghazali Talbi,Farouk Yalaoui,2017-09-18 This book highlights state of the art developments in metaheuristics research It examines all aspects of metaheuristic research including new algorithmic developments applications new research challenges theoretical developments implementation issues in depth experimental studies The book is divided into two sections Part I is focused on new optimization and modeling techniques based on metaheuristics The chapters in this section cover topics from multi objective problems with fuzzy data with triangular valued

objective functions to hyper heuristics optimization methodology designing genetic algorithms and also the cuckoo search algorithm The techniques described help to enhance the usability and increase the potential of metaheuristic algorithms Part II showcases advanced metaheuristic approaches to solve real life applications issues This includes an examination of scheduling the vehicle routing problem multimedia sensor network supplier selection bin packing objects tracking and radio frequency identification In the fields covered in the chapters are of high impact applications of metaheuristics The chapters offer innovative applications of metaheuristics that have a potential of widening research frontiers Altogether this book offers a comprehensive look at how researchers are currently using metaheuristics in different domains of design and application

Manufacturing in Digital Industries J. Paulo Davim,2020-07-06 Digital Industry can provide the framework for examining the challenges of future production technology This book describes some of the various aspects that can and may influence future manufacturing Computational intelligence techniques cyber physical systems virtual and cloud based manufacturing and man machine interaction are studied and some of the most recent research completed by international experts in industry and academia is considered Case studies provide practical solutions

**Handbook of Research on Soft Computing and Nature-Inspired Algorithms** Shandilya, Shishir K.,Shandilya, Smita,Deep, Kusum,Nagar, Atulya K.,2017-03-10 Soft computing and nature inspired computing both play a significant role in developing a better understanding to machine learning When studied together they can offer new perspectives on the learning process of machines The Handbook of Research on Soft Computing and Nature Inspired Algorithms is an essential source for the latest scholarly research on applications of nature inspired computing and soft computational systems Featuring comprehensive coverage on a range of topics and perspectives such as swarm intelligence speech recognition and electromagnetic problem solving this publication is ideally designed for students researchers scholars professionals and practitioners seeking current research on the advanced workings of intelligence in computing systems

Applied Multi-objective Optimization Nilanjan Dey,2024-03-16 The book explains basic ideas behind several kinds of applied multi objective optimization and shows how it will be applied in practical contexts in the domain of healthcare engineering design and manufacturing The book discusses how meta heuristic algorithms are successful in resolving challenging multi objective optimization issues in various disciplines including engineering economics medical and environmental management The topic is useful for graduates researchers and lecturers in optimization engineering management science and computer science

*Advances in Nature-Inspired Computing and Applications* Shishir Kumar Shandilya,Smita Shandilya,Atulya K. Nagar,2018-08-29 This book contains research contributions from leading global scholars in nature inspired computing It includes comprehensive coverage of each respective topic while also highlighting recent and future trends The contributions provides readers with a snapshot of the state of the art in the field of nature inspired computing and its application This book has focus on the current researches while highlighting the empirical results along with theoretical concepts to provide a comprehensive

reference for students researchers scholars professionals and practitioners in the field of Advanced Artificial Intelligence Nature Inspired Algorithms and Soft Computing      **Proceedings of the ... Congress on Evolutionary Computation**,2004      Advances in Nature and Biologically Inspired Computing Nelishia Pillay,Andries P. Engelbrecht,Ajith Abraham,Mathys C. du Plessis,Václav Snášel,Azah Kamilah Muda,2015-12-01 World Congress on Nature and Biologically Inspired Computing NaBIC is organized to discuss the state of the art as well as to address various issues with respect to Nurturing Intelligent Computing Towards Advancement of Machine Intelligence This Volume contains the papers presented in the Seventh World Congress NaBIC 15 held in Pietermaritzburg South Africa during December 01 03 2015 The 39 papers presented in this Volume were carefully reviewed and selected The Volume would be a valuable reference to researchers students and practitioners in the computational intelligence field      **Nature-Inspired Optimization Algorithms** Xin-She Yang,2020-09-09 Nature Inspired Optimization Algorithms Second Edition provides an introduction to all major nature inspired algorithms for optimization The book s unified approach balancing algorithm introduction theoretical background and practical implementation complements extensive literature with case studies to illustrate how these algorithms work Topics include particle swarm optimization ant and bee algorithms simulated annealing cuckoo search firefly algorithm bat algorithm flower algorithm harmony search algorithm analysis constraint handling hybrid methods parameter tuning and control and multi objective optimization This book can serve as an introductory book for graduates for lecturers in computer science engineering and natural sciences and as a source of inspiration for new applications Discusses and summarizes the latest developments in nature inspired algorithms with comprehensive timely literature Provides a theoretical understanding and practical implementation hints Presents a step by step introduction to each algorithm Includes four new chapters covering mathematical foundations techniques for solving discrete and combination optimization problems data mining techniques and their links to optimization algorithms and the latest deep learning techniques background and various applications      *Nature-Inspired Computation and Machine Learning* Alexander Gelbukh,Félix Castro Espinoza,Sofía N. Galicia-Haro,2014-11-05 The two volume set LNAI 8856 and LNAI 8857 constitutes the proceedings of the 13th Mexican International Conference on Artificial Intelligence MICAI 2014 held in Tuxtla Mexico in November 2014 The total of 87 papers plus 1 invited talk presented in these proceedings were carefully reviewed and selected from 348 submissions The first volume deals with advances in human inspired computing and its applications It contains 44 papers structured into seven sections natural language processing natural language processing applications opinion mining sentiment analysis and social network applications computer vision image processing logic reasoning and multi agent systems and intelligent tutoring systems The second volume deals with advances in nature inspired computation and machine learning and contains also 44 papers structured into eight sections genetic and evolutionary algorithms neural networks machine learning machine learning applications to audio and text data mining fuzzy logic robotics planning and scheduling and biomedical applications

*Applications of Nature-Inspired Computing and Optimization Techniques* Anupam Biswas,Alberto Paolo Tonda,Ripon Patgiri,Krishn Kumar Mishra,2024-04-02 Advances in Computers Volume 135 highlights advances in the field with this new volume Applications of Nature inspired Computing and Optimization Techniques presenting interesting chapters on a variety of timely topics including A Brief Introduction to Nature inspired Computing Optimization and Applications Overview of Non linear Interval Optimization Problems Solving the Aircraft Landing Problem using the Bee Colony Optimization BCO Algorithm Situation based Genetic Network Programming to Solve Agent Control Problems Small Signal Stability Enhancement of Large Interconnected Power System using Grasshopper Optimization Algorithm Tuned Power System Stabilizer Air Quality Modelling for Smart Cities of India by Nature Inspired AI A Sustainable Approach and much more Other sections cover Genetic Algorithm for the Optimization of Infectiological Parameter Values under Different Nutritional Status A Novel Influencer Mutation Strategy for Nature inspired Optimization Algorithms to Solve Electricity Price Forecasting Problem Recent Trends in Human and Bio Inspired Computing Use Case Study from Retail Perspective Domain Knowledge Enriched Summarization of Legal Judgment Documents via Grey Wolf Optimization and a host of other topics

**Nature-Inspired Computation and Swarm Intelligence** Xin-She Yang,2020-04-09 Nature inspired computation and swarm intelligence have become popular and effective tools for solving problems in optimization computational intelligence soft computing and data science Recently the literature in the field has expanded rapidly with new algorithms and applications emerging Nature Inspired Computation and Swarm Intelligence Algorithms Theory and Applications is a timely reference giving a comprehensive review of relevant state of the art developments in algorithms theory and applications of nature inspired algorithms and swarm intelligence It reviews and documents the new developments focusing on nature inspired algorithms and their theoretical analysis as well as providing a guide to their implementation The book includes case studies of diverse real world applications balancing explanation of the theory with practical implementation Nature Inspired Computation and Swarm Intelligence Algorithms Theory and Applications is suitable for researchers and graduate students in computer science engineering data science and management science who want a comprehensive review of algorithms theory and implementation within the fields of nature inspired computation and swarm intelligence Introduces nature inspired algorithms and their fundamentals including particle swarm optimization bat algorithm cuckoo search firefly algorithm flower pollination algorithm differential evolution and genetic algorithms as well as multi objective optimization algorithms and others Provides a theoretical foundation and analyses of algorithms including statistical theory and Markov chain theory on the convergence and stability of algorithms dynamical system theory benchmarking of optimization no free lunch theorems and a generalized mathematical framework Includes a diversity of case studies of real world applications feature selection clustering and classification tuning of restricted Boltzmann machines travelling salesman problem classification of white blood cells music generation by artificial intelligence swarm robots neural networks engineering

designs and others      **Evolutionary Computation for Dynamic Optimization Problems** Shengxiang Yang,Xin Yao,2013-11-18 This book provides a compilation on the state of the art and recent advances of evolutionary computation for dynamic optimization problems The motivation for this book arises from the fact that many real world optimization problems and engineering systems are subject to dynamic environments where changes occur over time Key issues for addressing dynamic optimization problems in evolutionary computation including fundamentals algorithm design theoretical analysis and real world applications are presented Evolutionary Computation for Dynamic Optimization Problems is a valuable reference to scientists researchers professionals and students in the field of engineering and science particularly in the areas of computational intelligence nature and bio inspired computing and evolutionary computation      *Handbook of Research on Modeling, Analysis, and Application of Nature-Inspired Metaheuristic Algorithms* Dash, Sujata,Tripathy, B.K.,Rahman, Atta ur,2017-08-10 The digital age is ripe with emerging advances and applications in technological innovations Mimicking the structure of complex systems in nature can provide new ideas on how to organize mechanical and personal systems The Handbook of Research on Modeling Analysis and Application of Nature Inspired Metaheuristic Algorithms is an essential scholarly resource on current algorithms that have been inspired by the natural world Featuring coverage on diverse topics such as cellular automata simulated annealing genetic programming and differential evolution this reference publication is ideal for scientists biological engineers academics students and researchers that are interested in discovering what models from nature influence the current technology centric world      **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      **Advances in Swarm Intelligence** Ying Tan,Yuhui Shi,Milan Tuba,2020-07-12 This book constitutes the proceedings of the 11th International Conference on Advances in Swarm Intelligence ICSI 2020 held in July 2020 in Belgrade Serbia Due to the COVID 19 pandemic the conference was held virtually The 63 papers included in this volume were carefully reviewed and selected from

127 submissions The papers are organized in 12 cohesive topical sections as follows Swarm intelligence and nature inspired computing swarm based computing algorithms for optimization particle swarm optimization ant colony optimization brain storm optimization algorithm bacterial foraging optimization genetic algorithm and evolutionary computation multi objective optimization machine learning data mining multi agent system and robotic swarm and other applications Nature-Inspired Intelligent Computing Techniques in Bioinformatics Khalid Raza,2022-10-31 This book encapsulates and occupies recent advances and state of the art applications of nature inspired computing NIC techniques in the field of bioinformatics and computational biology which would aid medical sciences in various clinical applications This edited volume covers fundamental applications scope and future perspectives of NIC techniques in bioinformatics including genomic profiling gene expression data classification DNA computation systems and network biology solving personalized therapy complications antimicrobial resistance in bacterial pathogens and computer aided drug design discovery and therapeutics It also covers the role of NIC techniques in various diseases and disorders including cancer detection and diagnosis breast cancer lung disorder detection disease biomarkers and potential therapeutics identifications **Recent Developments in Intelligent Nature-Inspired Computing** Patnaik, Srikanta,2017-03-09 The development of nature inspired computational techniques has enhanced problem solving in dynamic and uncertain environments By implementing effective computing strategies this ensures adaptable self organizing and decentralized behavioral techniques Recent Developments in Intelligent Nature Inspired Computing is an authoritative reference source for the latest scholarly material on natural computation methods and applications in diverse fields Highlighting multidisciplinary studies on swarm intelligence global optimization and group technology this publication is an ideal reference source for professionals researchers scholars and engineers interested in the latest developments in computer science methodologies



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