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KEY=FOR - BRENDEN ASHTYN

MULTIDIMENSIONAL PARTICLE SWARM OPTIMIZATION FOR MACHINE LEARNING AND PATTERN RECOGNITION

Springer Science & Business Media For many engineering problems we require optimization processes with dynamic adaptation as we aim to establish the dimension of the search space where the optimum solution resides and develop robust techniques to avoid the local optima usually associated with multimodal problems. This book explores multidimensional particle swarm optimization, a technique developed by the authors that addresses these requirements in a well-defined algorithmic approach. After an introduction to the key optimization techniques, the authors introduce their unified framework and demonstrate its advantages in challenging application domains, focusing on the state of the art of multidimensional extensions such as global convergence in particle swarm optimization, dynamic data clustering, evolutionary neural networks, biomedical applications and personalized ECG classification, content-based image classification and retrieval, and evolutionary feature synthesis. The content is characterized by strong practical considerations, and the book is supported with fully documented source code for all applications presented, as well as many sample datasets. The book will be of benefit to researchers and practitioners working in the areas of machine intelligence, signal processing, pattern recognition, and data mining, or using principles from these areas in their application domains. It may also be used as a reference text for graduate courses on swarm optimization, data clustering and classification, content-based multimedia search, and biomedical signal processing applications.

SET-BASED PARTICLE SWARM OPTIMIZATION

Particle swarm optimization (PSO) algorithms have been successfully applied to discrete-valued optimization problems. However, in many cases the algorithms have been tailored specifically for the problem at hand. This study proposes a generic set-based particle swarm optimization algorithm, called SBPSO, for use on discrete-valued optimization problems that can be formulated as set-based problems. The performance of the SBPSO is then evaluated on two different discrete optimization problems: the multidimensional knapsack problem (MKP) and the feature selection problem (FSP) from machine learning. In both cases, the SBPSO is compared to three other discrete PSO algorithms from literature. On the MKP, the SBPSO is shown to outperform, with statistical significance, the other algorithms. On the FSP and using a k-nearest neighbor classifier, the SBPSO is shown to outperform, with statistical significance, the other algorithms. When a Gaussian Naive Bayes or a J48 decision tree classifier is used, no algorithm can be shown to outperform on the FSP.

ENCYCLOPEDIA OF MACHINE LEARNING

Springer Science & Business Media This comprehensive encyclopedia, in A-Z format, provides easy access to relevant information for those seeking entry into any aspect within the broad field of Machine Learning. Most of the entries in this preeminent work include useful literature references.

PARTICLE SWARM OPTIMIZATION AND INTELLIGENCE: ADVANCES AND APPLICATIONS

ADVANCES AND APPLICATIONS

IGI Global "This book presents the most recent and established developments of Particle swarm optimization (PSO) within a unified framework by noted researchers in the field"-- Provided by publisher.

DESIGN OF A SUPERCONDUCTING DC WIND GENERATOR

KIT Scientific Publishing The trend towards larger power ratings of wind turbines asks for innovations in power generation, which requires lower weight and cost, smaller size, higher efficiency and reliability. Due to high current-carrying capability and no DC losses of superconductors, a superconducting wind generator can have a superior power to weight/volume ratio with high efficiency. The work in the book mainly focuses on the feasibility study and design of a superconducting DC wind generator.

HANDBOOK OF RESEARCH ON ARTIFICIAL INTELLIGENCE TECHNIQUES AND ALGORITHMS

IGI Global For decades, optimization methods such as Fuzzy Logic, Artificial Neural Networks, Firefly, Simulated annealing, and Tabu search, have been capable of handling and tackling a wide range of real-world application problems in society and nature. Analysts have turned to these problem-solving techniques in the event during natural disasters and chaotic systems research. The Handbook of Research on Artificial Intelligence Techniques and Algorithms highlights the cutting edge developments in this promising research area. This premier reference work applies Meta-heuristics Optimization (MO) Techniques to real world problems in a variety of fields including business, logistics, computer science, engineering, and government. This work is particularly relevant to researchers, scientists, decision-makers, managers, and practitioners.

INTERNET OF THINGS AND MACHINE LEARNING IN AGRICULTURE

TECHNOLOGICAL IMPACTS AND CHALLENGES

Walter de Gruyter GmbH & Co KG Agriculture is one of the most fundamental human activities. As the farming capacity has expanded, the usage of resources such as land, fertilizer, and water has grown exponentially, and environmental pressures from modern farming techniques have stressed natural landscapes. Still, by some estimates, worldwide food production needs to increase to keep up with global food demand. Machine Learning and the Internet of Things can play a promising role in the Agricultural industry, and help to increase food production while respecting the environment. This book explains how these technologies can be applied, offering many case studies developed in the research world.

FUNDAMENTALS OF COMPUTATIONAL INTELLIGENCE

NEURAL NETWORKS, FUZZY SYSTEMS, AND EVOLUTIONARY COMPUTATION

John Wiley & Sons Provides an in-depth and even treatment of the three pillars of computational intelligence and how they relate to one another This book covers the three fundamental topics that form the basis of computational intelligence: neural networks, fuzzy systems, and evolutionary computation. The text focuses on inspiration, design, theory, and practical aspects of implementing procedures to solve real-world problems. While other books in the three fields that comprise computational intelligence are written by specialists in one discipline, this book is co-written by current former Editor-in-Chief of IEEE Transactions on Neural Networks and Learning Systems, a former Editor-in-Chief of IEEE Transactions on Fuzzy Systems, and the founding Editor-in-Chief of IEEE Transactions on Evolutionary Computation. The coverage across the three topics is both uniform and consistent in style and notation. Discusses single-layer and multilayer neural networks, radial-basis function networks, and recurrent neural networks Covers fuzzy set theory, fuzzy relations, fuzzy logic interference, fuzzy clustering and classification, fuzzy measures and fuzzy integrals Examines evolutionary optimization, evolutionary learning and problem solving, and collective intelligence Includes end-of-chapter practice problems that will help readers apply methods and techniques to real-world problems Fundamentals of Computational intelligence is written for advanced undergraduates, graduate students, and practitioners in electrical and computer engineering, computer science, and other engineering disciplines.

INTELLIGENT COMPUTING AND INNOVATION ON DATA SCIENCE

PROCEEDINGS OF ICTIDS 2021

Springer Nature This book gathers high-quality papers presented at 2nd International Conference on Technology Innovation and Data Sciences (ICTIDS 2021), organized by Lincoln University, Malaysia from 19 - 20 February 2021. It covers wide range of recent technologies like artificial intelligence and machine learning, big data and data sciences, Internet of Things (IoT), and IoT-based digital ecosystem. The book brings together works from researchers, scientists, engineers, scholars and students in the areas of engineering and technology, and provides an opportunity for the dissemination of original research results, new ideas, research and development, practical experiments, which concentrate on both theory and practices, for the benefit of common man.

PARTICLE SWARM OPTIMIZATION

BoD - Books on Demand Particle swarm optimization (PSO) is a population based stochastic optimization technique influenced by the social behavior of bird flocking or fish schooling. PSO shares many similarities with evolutionary computation techniques such as Genetic Algorithms (GA). The system is initialized with a population of random solutions and searches for optima by updating generations. However, unlike GA, PSO has no evolution operators such as crossover and mutation. In PSO, the potential solutions, called particles, fly through the problem space by following the current optimum particles. This book represents the contributions of the top researchers in this field and will serve as a

valuable tool for professionals in this interdisciplinary field.

RISK AND UNCERTAINTY REDUCTION BY USING ALGEBRAIC INEQUALITIES

CRC Press This book covers the application of algebraic inequalities for reliability improvement and for uncertainty and risk reduction. It equips readers with powerful domain-independent methods for reducing risk based on algebraic inequalities and demonstrates the significant benefits derived from the application for risk and uncertainty reduction. Algebraic inequalities: • Provide a powerful reliability improvement, risk and uncertainty reduction method that transcends engineering and can be applied in various domains of human activity • Present an effective tool for dealing with deep uncertainty related to key reliability-critical parameters of systems and processes • Permit meaningful interpretations which link abstract inequalities with the real world • Offer a tool for determining tight bounds for the variation of risk-critical parameters and complying the design with these bounds to avoid failure • Allow optimising designs and processes by minimising the deviation of critical output parameters from their specified values and maximising their performance This book is primarily for engineering professionals and academic researchers in virtually all existing engineering disciplines.

HANDBOOK OF SWARM INTELLIGENCE

CONCEPTS, PRINCIPLES AND APPLICATIONS

Springer Science & Business Media From nature, we observe swarming behavior in the form of ant colonies, bird flocking, animal herding, honey bees, swarming of bacteria, and many more. It is only in recent years that researchers have taken notice of such natural swarming systems as culmination of some form of innate collective intelligence, albeit swarm intelligence (SI) - a metaphor that inspires a myriad of computational problem-solving techniques. In computational intelligence, swarm-like algorithms have been successfully applied to solve many real-world problems in engineering and sciences. This handbook volume serves as a useful foundational as well as consolidatory state-of-art collection of articles in the field from various researchers around the globe. It has a rich collection of contributions pertaining to the theoretical and empirical study of single and multi-objective variants of swarm intelligence based algorithms like particle swarm optimization (PSO), ant colony optimization (ACO), bacterial foraging optimization algorithm (BFOA), honey bee social foraging algorithms, and harmony search (HS). With chapters describing various applications of SI techniques in real-world engineering problems, this handbook can be a valuable resource for researchers and practitioners, giving an in-depth flavor of what SI is capable of achieving.

DESIGN AND OPTIMIZATION FOR 5G WIRELESS COMMUNICATIONS

John Wiley & Sons This book offers a technical background to the design and optimization of wireless communication systems, covering optimization algorithms for wireless and 5G communication systems design. The book introduces the design and optimization systems which target capacity, latency, and connection density; including Enhanced Mobile Broadband Communication (eMBB), Ultra-Reliable and Low Latency Communication (URLL), and Massive Machine Type Communication (mMTC). The book is organized into two distinct parts: Part I, mathematical methods and optimization algorithms for wireless communications are introduced, providing the reader with the required mathematical background. In Part II, 5G communication systems are designed and optimized using the mathematical methods and optimization algorithms.

COGNITIVE AND SOFT COMPUTING TECHNIQUES FOR THE ANALYSIS OF HEALTHCARE DATA

Academic Press Cognitive and Soft Computing Techniques for the Analysis of Healthcare Data discusses the insight of data processing applications in various domains through soft computing techniques and enormous advancements in the field. The book focuses on the cross-disciplinary mechanisms and ground-breaking research ideas on novel techniques and data processing approaches in handling structured and unstructured healthcare data. It also gives insight into various information-processing models and many memories associated with it while processing the information for forecasting future trends and decision making. This book is an excellent resource for researchers and professionals who work in the Healthcare Industry, Data Science, and Machine learning. Focuses on data-centric operations in the Healthcare industry Provides the latest trends in healthcare data analytics and practical implementation outcomes of the proposed models Addresses real-time challenges and case studies in the Healthcare industry

ALGORITHMS FOR OPTIMIZATION

MIT Press A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems. This book offers a comprehensive introduction to optimization with a focus on practical algorithms. The book approaches optimization from an engineering perspective, where the objective is to design a system that optimizes a set of metrics subject to constraints. Readers will learn about computational approaches for a range of challenges, including searching high-dimensional spaces, handling problems where there are multiple competing objectives, and accommodating uncertainty in the metrics. Figures, examples, and exercises convey the intuition behind the mathematical approaches. The text provides concrete implementations in the Julia programming language. Topics covered include derivatives and their generalization to multiple dimensions; local descent and first- and second-order methods that inform local descent; stochastic methods, which introduce randomness into the optimization process; linear constrained optimization, when both the objective function and the constraints are linear; surrogate models, probabilistic surrogate models, and using probabilistic surrogate models to guide optimization; optimization under uncertainty; uncertainty propagation; expression optimization; and multidisciplinary design optimization. Appendixes offer an introduction to the Julia language, test functions for evaluating algorithm performance, and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text. The book can be used by advanced undergraduates and graduate students in mathematics, statistics, computer science, any engineering field, (including electrical engineering and aerospace engineering), and operations research, and as a reference for professionals.

RESEARCH AND DEVELOPMENT IN INTELLIGENT SYSTEMS XXXII

INCORPORATING APPLICATIONS AND INNOVATIONS IN INTELLIGENT SYSTEMS XXIII

Springer The papers in this volume are the refereed papers presented at AI-2015, the Thirty-fifth SGA International Conference on Innovative Techniques and Applications of Artificial Intelligence, held in Cambridge in December 2015 in both the technical and the application streams. They present new and innovative developments and applications, divided into technical stream sections on Knowledge Discovery and Data Mining, Machine Learning and Knowledge Acquisition, and AI in Action, followed by application stream sections on Applications of Genetic Algorithms, Applications of Intelligent Agents and Evolutionary Techniques, and AI Applications. The volume also includes the text of short papers presented as posters at the conference. This is the thirty-second volume in the Research and Development in Intelligent Systems series, which also incorporates the twenty-third volume in the Applications and Innovations in Intelligent Systems series. These series are essential reading for those who wish to keep up to date with developments in this important field.

ARTIFICIAL INTELLIGENCE-BASED ENERGY MANAGEMENT SYSTEMS FOR SMART MICROGRIDS

CRC Press Modeling and optimization of energy management systems for micro- and mini-grids play an important role in the fields of energy generation dispatch, system operation, protection coordination, power quality issues, and peak demand conflict with grid security. This comprehensive reference text provides an in-depth insight into these topics. This text discusses the use of meta-heuristic and artificial intelligence algorithms for developing energy management systems with energy use prediction for mini- and microgrid systems. It covers important concepts including modeling of microgrid and energy management systems, optimal protection coordination-based microgrid energy management, optimal energy dispatch with energy management systems, and peak demand management with energy management systems. Key Features: Presents a comprehensive discussion of mini- and microgrid concepts Discusses AC and DC microgrid modeling in detail Covers optimization of mini- and microgrid systems using AI and meta-heuristic techniques Provides MATLAB®-based simulations on a mini- and microgrid Comprehensively discussing concepts of microgrids with the help of software-based simulations, this text will be useful as a reference text for graduate students and professionals in the fields of electrical engineering, electronics and communication engineering, renewable energy, and clean technology.

YIELD-AWARE ANALOG IC DESIGN AND OPTIMIZATION IN NANOMETER-SCALE TECHNOLOGIES

Springer Nature This book presents a new methodology with reduced time impact to address the problem of analog integrated circuit (IC) yield estimation by means of Monte Carlo (MC) analysis, inside an optimization loop of a population-based algorithm. The low time impact on the overall optimization processes enables IC designers to perform yield optimization with the most accurate yield estimation method, MC simulations using foundry statistical device models considering local and global variations. The methodology described by the authors delivers on average a reduction of 89% in the total number of MC simulations, when compared to the exhaustive MC analysis over the full population. In addition to describing a newly developed yield estimation technique, the authors also provide detailed background on automatic analog IC sizing and optimization.

ADVANCED TECHNIQUES FOR AUDIO WATERMARKING

Springer This book provides information on digital audio watermarking, its applications, and its evaluation for copyright protection of audio signals - both basic and advanced. The author covers various advanced digital audio watermarking algorithms that can be used for copyright protection of audio signals. These algorithms are implemented using hybridization of advanced signal processing transforms such as fast discrete curvelet transform (FDCuT), redundant discrete wavelet transform (RDWT), and another signal processing transform such as discrete cosine transform (DCT). In these algorithms, Arnold scrambling is used to enhance the security of the watermark logo. This book is divided in to three portions: basic audio watermarking and its classification, audio watermarking algorithms, and audio watermarking algorithms using advanced signal transforms. The book also covers optimization based audio watermarking. Describes basic of digital audio watermarking and its applications, including evaluation parameters for digital audio watermarking algorithms; Provides audio watermarking algorithms using advanced signal transformations; Provides optimization based audio watermarking algorithms.

FUNDAMENTALS OF LASER POWDER BED FUSION OF METALS

Elsevier Laser powder bed fusion of metals is a technology that makes use of a laser beam to selectively melt metal powder layer-by-layer in order to fabricate complex geometries in

high performance materials. The technology is currently transforming aerospace and biomedical manufacturing and its adoption is widening into other industries as well, including automotive, energy, and traditional manufacturing. With an increase in design freedom brought to bear by additive manufacturing, new opportunities are emerging for designs not possible previously and in material systems that now provide sufficient performance to be qualified in end-use mission-critical applications. After decades of research and development, laser powder bed fusion is now enabling a new era of digitally driven manufacturing. Fundamentals of Laser Powder Bed Fusion of Metals will provide the fundamental principles in a broad range of topics relating to metal laser powder bed fusion. The target audience includes new users, focusing on graduate and undergraduate students; however, this book can also serve as a reference for experienced users as well, including senior researchers and engineers in industry. The current best practices are discussed in detail, as well as the limitations, challenges, and potential research and commercial opportunities moving forward. Presents laser powder bed fusion fundamentals, as well as their inherent challenges Provides an up-to-date summary of this advancing technology and its potential Provides a comprehensive textbook for universities, as well as a reference for industry Acts as quick-reference guide

AI AND MACHINE LEARNING PARADIGMS FOR HEALTH MONITORING SYSTEM

INTELLIGENT DATA ANALYTICS

Springer Nature This book embodies principles and applications of advanced soft computing approaches in engineering, healthcare and allied domains directed toward the researchers aspiring to learn and apply intelligent data analytics techniques. The first part covers AI, machine learning and data analytics tools and techniques and their applications to the class of several hospital and health real-life problems. In the later part, the applications of AI, ML and data analytics shall be covered over the wide variety of applications in hospital, health, engineering and/or applied sciences such as the clinical services, medical image analysis, management support, quality analysis, bioinformatics, device analysis and operations. The book presents knowledge of experts in the form of chapters with the objective to introduce the theme of intelligent data analytics and discusses associated theoretical applications. At last, it presents simulation codes for the problems included in the book for better understanding for beginners.

DEMISTIFYING BIG DATA, MACHINE LEARNING, AND DEEP LEARNING FOR HEALTHCARE ANALYTICS

Academic Press Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics presents the changing world of data utilization, especially in clinical healthcare. Various techniques, methodologies, and algorithms are presented in this book to organize data in a structured manner that will assist physicians in the care of patients and help biomedical engineers and computer scientists understand the impact of these techniques on healthcare analytics. The book is divided into two parts: Part 1 covers big data aspects such as healthcare decision support systems and analytics-related topics. Part 2 focuses on the current frameworks and applications of deep learning and machine learning, and provides an outlook on future directions of research and development. The entire book takes a case study approach, providing a wealth of real-world case studies in the application chapters to act as a foundational reference for biomedical engineers, computer scientists, healthcare researchers, and clinicians. Provides a comprehensive reference for biomedical engineers, computer scientists, advanced industry practitioners, researchers, and clinicians to understand and develop healthcare analytics using advanced tools and technologies Includes in-depth illustrations of advanced techniques via dataset samples, statistical tables, and graphs with algorithms and computational methods for developing new applications in healthcare informatics Unique case study approach provides readers with insights for practical clinical implementation

COMPUTATIONAL INTELLIGENCE FOR MACHINE LEARNING AND HEALTHCARE INFORMATICS

Walter de Gruyter GmbH & Co KG This book presents a variety of techniques designed to enhance and empower multi-disciplinary and multi-institutional machine learning research in healthcare informatics. It is intended to provide a unique compendium of current and emerging machine learning paradigms for healthcare informatics, reflecting the diversity, complexity, and depth and breadth of this multi-disciplinary area.

NATURE-INSPIRED COMPUTATION AND MACHINE LEARNING

13TH MEXICAN INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE, MICAI2014, TUXTLA GUTIÉRREZ, MEXICO, NOVEMBER 16-22, 2014. PROCEEDINGS, PART II

Springer 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.

HIGH-SPEED RAILWAY OPERATION UNDER EMERGENT CONDITIONS

THEORETICAL METHODOLOGY AND APPLICATIONS

Springer Nature This book addresses the current development status of high-speed railways globally and analyzes their operational schemes and practices under emergent conditions. It covers methods and problem-solving philosophy with regard to complexity analysis, capacity evaluation, passenger-flow forecasts, operating strategies, passenger-flow allocation, resource allocation and supporting technologies in the context of serious accidents and adverse environmental influences on train operation and service organization of high-speed railways. The abnormal scenarios, emergent conditions, adverse events and corresponding theoretical and applicational solutions dealing with the train operation both in line and network scale are all from real-world cases related to and designed for Chinese high-speed railway network which is the largest in scale, the highest in complexity and the most difficult in tackling with the complex and diverse climate and geographical environment, and thus makes the book both theoretically rigorous and practically applicable. It not only helps readers consider the train and network interactions from the perspective of complexity science, but also provides them with a philosophical framework and approaches available to construct their own roadmap and problem-solving paradigms in their daily research or management. This book is suitable for researchers, postgraduates and managerial and engineering practitioners in railway-related fields, especially in high-speed railway operation and emergency management.

DIGITAL TRANSFORMATION OF THE DESIGN, CONSTRUCTION AND MANAGEMENT PROCESSES OF THE BUILT ENVIRONMENT

Springer Nature This open access book focuses on the development of methods, interoperable and integrated ICT tools, and survey techniques for optimal management of the building process. The construction sector is facing an increasing demand for major innovations in terms of digital dematerialization and technologies such as the Internet of Things, big data, advanced manufacturing, robotics, 3D printing, blockchain technologies and artificial intelligence. The demand for simplification and transparency in information management and for the rationalization and optimization of very fragmented and splintered processes is a key driver for digitization. The book describes the contribution of the ABC Department of the Polytechnic University of Milan (Politecnico di Milano) to R&D activities regarding methods and ICT tools for the interoperable management of the different phases of the building process, including design, construction, and management. Informative case studies complement the theoretical discussion. The book will be of interest to all stakeholders in the building process - owners, designers, constructors, and faculty managers - as well as the research sector.

MACHINE LEARNING: ECML 2005

16TH EUROPEAN CONFERENCE ON MACHINE LEARNING, PORTO, PORTUGAL, OCTOBER 3-7, 2005, PROCEEDINGS

Springer The European Conference on Machine Learning (ECML) and the European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD) were jointly organized this year for the 7th time in a row, after some years of mutual independence before. After Freiburg (2001), Helsinki (2002), Cavtat (2003) and Pisa (2004), Porto received the 16th edition of ECML and the 9th PKDD in October 3-7. Having the two conferences together seems to be working well: 585 different paper submissions were received for both events, which maintains the high submission standard of last year. Of these, 335 were submitted to ECML only, 220 to PKDD only and 30 to both. Such a high volume of scientific work required a tremendous effort from Area Chairs, Program Committee members and some additional reviewers. On average, PC members had 10 papers to evaluate, and Area Chairs had 25 papers to decide upon. We managed to have 3 highly qualified independent reviews per paper (with very few exceptions) and one additional overall input from one of the Area Chairs. After the authors' responses and the online discussions for many of the papers, we arrived at the final selection of 40 regular papers for ECML and 35 for PKDD. Besides these, 32 others were accepted as short papers for ECML and 35 for PKDD. This represents a joint acceptance rate of around 13% for regular papers and 25% overall. We thank all involved for all the effort with reviewing and selection of papers. Besides the core technical program, ECML and PKDD had 6 invited speakers, 10 workshops, 8 tutorials and a Knowledge Discovery Challenge.

COMPUTATIONAL SCIENCE AND ITS APPLICATIONS -- ICCSA 2012

12TH INTERNATIONAL CONFERENCE, SALVADOR DE BAHIA, BRAZIL, JUNE 18-21, 2012, PROCEEDINGS, PART III

Springer The four-volume set LNCS 7333-7336 constitutes the refereed proceedings of the 12th International Conference on Computational Science and Its Applications, ICCSA 2012, held in Salvador de Bahia, Brazil, in June 2012. The four volumes contain papers presented in the following workshops: 7333 - advances in high performance algorithms and applications (AHPAA); bioinspired computing and applications (BIOCA); computational geometry and applications (CGA); chemistry and materials sciences and technologies (CMST); cities, technologies and planning (CTP); 7334 - econometrics and multidimensional evaluation in the urban environment (EMEUE); geographical analysis, urban modeling, spatial statistics (Geo-An-Mod); 7335 - optimization techniques and applications (OTA); mobile communications (MC); mobile-computing, sensing and actuation for cyber physical systems

(MSA4CPS); remote sensing (RS); 7336 - software engineering processes and applications (SEPA); software quality (SQ); security and privacy in computational sciences (SPCS); soft computing and data engineering (SCDE). The topics of the fully refereed papers are structured according to the four major conference themes: 7333 - computational methods, algorithms and scientific application; 7334 - geometric modelling, graphics and visualization; 7335 - information systems and technologies; 7336 - high performance computing and networks.

SOFT COMPUTING IN DATA SCIENCE

FIRST INTERNATIONAL CONFERENCE, SCDS 2015, PUTRAJAYA, MALAYSIA, SEPTEMBER 2-3, 2015, PROCEEDINGS

Springer This book constitutes the refereed proceedings of the International Conference on Soft Computing in Data Science, SCDS 2015, held in Putrajaya, Malaysia, in September 2015. The 25 revised full papers presented were carefully reviewed and selected from 69 submissions. The papers are organized in topical sections on data mining; fuzzy computing; evolutionary computing and optimization; pattern recognition; human machine interface; hybrid methods.

OPTIMIZATION FOR MACHINE LEARNING

Machine Learning Mastery Optimization happens everywhere. Machine learning is one example of such and gradient descent is probably the most famous algorithm for performing optimization. Optimization means to find the best value of some function or model. That can be the maximum or the minimum according to some metric. Using clear explanations, standard Python libraries, and step-by-step tutorial lessons, you will learn how to find the optimum point to numerical functions confidently using modern optimization algorithms.

COMPUTATIONAL INTELLIGENCE

AN INTRODUCTION

John Wiley & Sons Computational Intelligence: An Introduction, Second Edition offers an in-depth exploration into the adaptive mechanisms that enable intelligent behaviour in complex and changing environments. The main focus of this text is centred on the computational modelling of biological and natural intelligent systems, encompassing swarm intelligence, fuzzy systems, artificial neural networks, artificial immune systems and evolutionary computation. Engelbrecht provides readers with a wide knowledge of Computational Intelligence (CI) paradigms and algorithms; inviting readers to implement and problem solve real-world, complex problems within the CI development framework. This implementation framework will enable readers to tackle new problems without any difficulty through a single Java class as part of the CI library. Key features of this second edition include: A tutorial, hands-on based presentation of the material. State-of-the-art coverage of the most recent developments in computational intelligence with more elaborate discussions on intelligence and artificial intelligence (AI). New discussion of Darwinian evolution versus Lamarckian evolution, also including swarm robotics, hybrid systems and artificial immune systems. A section on how to perform empirical studies; topics including statistical analysis of stochastic algorithms, and an open source library of CI algorithms. Tables, illustrations, graphs, examples, assignments, Java code implementing the algorithms, and a complete CI implementation and experimental framework. Computational Intelligence: An Introduction, Second Edition is essential reading for third and fourth year undergraduate and postgraduate students studying CI. The first edition has been prescribed by a number of overseas universities and is thus a valuable teaching tool. In addition, it will also be a useful resource for researchers in Computational Intelligence and Artificial Intelligence, as well as engineers, statisticians, operational researchers, and bioinformaticians with an interest in applying AI or CI to solve problems in their domains. Check out <http://www.ci.cs.up.ac.za> for examples, assignments and Java code implementing the algorithms.

SWARM INTELLIGENCE ALGORITHMS (TWO VOLUME SET)

CRC Press Swarm intelligence algorithms are a form of nature-based optimization algorithms. Their main inspiration is the cooperative behavior of animals within specific communities. This can be described as simple behaviors of individuals along with the mechanisms for sharing knowledge between them, resulting in the complex behavior of the entire community. Examples of such behavior can be found in ant colonies, bee swarms, schools of fish or bird flocks. Swarm intelligence algorithms are used to solve difficult optimization problems for which there are no exact solving methods or the use of such methods is impossible, e.g. due to unacceptable computational time. This set comprises two volumes: Swarm Intelligence Algorithms: A Tutorial and Swarm Intelligence Algorithms: Modifications and Applications. The first volume thoroughly presents the basics of 24 algorithms selected from the entire family of swarm intelligence algorithms. It contains a detailed explanation of how each algorithm works, along with relevant program codes in Matlab and the C++ programming language, as well as numerical examples illustrating step-by-step how individual algorithms work. The second volume describes selected modifications of these algorithms and presents their practical applications. This book presents 24 swarm algorithms together with their modifications and practical applications. Each chapter is devoted to one algorithm. It contains a short description along with a pseudo-code showing the various stages of its operation. In addition, each chapter contains a description of selected modifications of the algorithm and shows how it can be used to solve a selected practical problem.

NEW OPTIMIZATION TECHNIQUES IN ENGINEERING

Springer Presently, general-purpose optimization techniques such as Simulated Annealing, and Genetic Algorithms, have become standard optimization techniques. Concerted research efforts have been made recently in order to invent novel optimization techniques for solving real life problems, which have the attributes of memory update and population-based search solutions. The book describes a variety of these novel optimization techniques which in most cases outperform the standard optimization techniques in many application areas. New Optimization Techniques in Engineering reports applications and results of the novel optimization techniques considering a multitude of practical problems in the different engineering disciplines - presenting both the background of the subject area and the techniques for solving the problems.

SWARM INTELLIGENCE AND BIO-INSPIRED COMPUTATION

18. OPPORTUNITIES AND CHALLENGES OF INTEGRATING BIO-INSPIRED OPTIMIZATION AND DATA MINING ALGORITHMS

Elsevier Inc. Chapters Data mining has evolved from methods of simple statistical analysis to complex pattern recognition in the past decades. During the progression, the data mining algorithms are modified or extended in order to overcome some specific problems. This chapter discusses about the prospects of improving data mining algorithms by integrating bio-inspired optimization, which has lately captivated much of researchers' attention. In particular, high dimensionality and the unavailability of the whole data set (as in stream mining) in the training data have known to be two major challenges. We demonstrated that these two challenges, through two small examples such as K-means clustering and time-series classification, can be overcome by integrating data mining and bio-inspired algorithms.

ADVANCES IN NEURAL COMPUTATION, MACHINE LEARNING, AND COGNITIVE RESEARCH

SELECTED PAPERS FROM THE XIX INTERNATIONAL CONFERENCE ON NEUROINFORMATICS, OCTOBER 2-6, 2017, MOSCOW, RUSSIA

Springer This book describes new theories and applications of artificial neural networks, with a special focus on neural computation, cognitive science and machine learning. It discusses cutting-edge research at the intersection between different fields, from topics such as cognition and behavior, motivation and emotions, to neurocomputing, deep learning, classification and clustering. Further topics include signal processing methods, robotics and neurobionics, and computer vision alike. The book includes selected papers from the XIX International Conference on Neuroinformatics, held on October 2-6, 2017, in Moscow, Russia.

PARTICLE SWARM OPTIMIZATION

John Wiley & Sons This is the first book devoted entirely to Particle Swarm Optimization (PSO), which is a non-specific algorithm, similar to evolutionary algorithms, such as taboo search and ant colonies. Since its original development in 1995, PSO has mainly been applied to continuous-discrete heterogeneous strongly non-linear numerical optimization and it is thus used almost everywhere in the world. Its convergence rate also makes it a preferred tool in dynamic optimization.

MACHINE LEARNING AND DATA MINING IN PATTERN RECOGNITION

14TH INTERNATIONAL CONFERENCE, MLDM 2018, NEW YORK, NY, USA, JULY 15-19, 2018, PROCEEDINGS, PART I

Springer This two-volume set LNAI 10934 and LNAI 10935 constitutes the refereed proceedings of the 14th International Conference on Machine Learning and Data Mining in Pattern Recognition, MLDM 2018, held in New York, NY, USA in July 2018. The 92 regular papers presented in this two-volume set were carefully reviewed and selected from 298 submissions. The topics range from theoretical topics for classification, clustering, association rule and pattern mining to specific data mining methods for the different multi-media data types such as image mining, text mining, video mining, and Web mining.

ADVANCES IN MACHINE LEARNING II

DEDICATED TO THE MEMORY OF PROFESSOR RYSZARD S. MICHALSKI

Springer Science & Business Media This is the second volume of a large two-volume editorial project we wish to dedicate to the memory of the late Professor Ryszard S. Michalski who passed away in 2007. He was one of the fathers of machine learning, an exciting and relevant, both from the practical and theoretical points of view, area in modern computer science and information technology. His research career started in the mid-1960s in Poland, in the Institute of Automation, Polish Academy of Sciences in Warsaw, Poland. He left for the USA in 1970, and since then had worked there at various universities, notably, at the University of Illinois at Urbana - Champaign and finally, until his untimely death, at George Mason University. We, the editors, had been lucky to be able to meet and collaborate with Ryszard for years, indeed some of us knew him when he was still in Poland. After he

started working in the USA, he was a frequent visitor to Poland, taking part at many conferences until his death. We had also witnessed with a great personal pleasure honors and awards he had received over the years, notably when some years ago he was elected Foreign Member of the Polish Academy of Sciences among some top scientists and scholars from all over the world, including Nobel prize winners. Professor Michalski's research results influenced very strongly the development of machine learning, data mining, and related areas. Also, he inspired many established and younger scholars and scientists all over the world. We feel very happy that so many top scientists from all over the world agreed to pay the last tribute to Professor Michalski by writing papers in their areas of research. These papers will constitute the most appropriate tribute to Professor Michalski, a devoted scholar and researcher. Moreover, we believe that they will inspire many newcomers and younger researchers in the area of broadly perceived machine learning, data analysis and data mining. The papers included in the two volumes, Machine Learning I and Machine Learning II, cover diverse topics, and various aspects of the fields involved. For convenience of the potential readers, we will now briefly summarize the contents of the particular chapters.

ADVANCES IN SWARM INTELLIGENCE

4TH INTERNATIONAL CONFERENCE, ICSI 2013, HARBIN, CHINA, JUNE 12-15, 2013, PROCEEDINGS, PART II

Springer This book and its companion volume, LNCS vols. 7928 and 7929 constitute the proceedings of the 4th International Conference on Swarm Intelligence, ICSI 2013, held in Harbin, China in June 2013. The 129 revised full papers presented were carefully reviewed and selected from 268 submissions. The papers are organized in 22 cohesive sections covering all major topics of swarm intelligence research and developments. The topics covered in this volume are: hybrid algorithms, swarm-robot and multi-agent systems, support vector machines, data mining methods, system and information security, intelligent control, wireless sensor network, scheduling and path planning, image and video processing, and other applications.

ANALYZING RISK THROUGH PROBABILISTIC MODELING IN OPERATIONS RESEARCH

IGI Global Probabilistic modeling represents a subject spanning many branches of mathematics, economics, and computer science to connect pure mathematics with applied sciences. Operational research also relies on this connection to enable the improvement of business functions and decision making. Analyzing Risk through Probabilistic Modeling in Operations Research is an authoritative reference publication discussing the various challenges in management and decision science. Featuring exhaustive coverage on a range of topics within operational research including, but not limited to, decision analysis, data mining, process modeling, probabilistic interpolation and extrapolation, and optimization methods, this book is an essential reference source for decision makers, academicians, researchers, advanced-level students, technology developers, and government officials interested in the implementation of probabilistic modeling in various business applications.