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Introduction to Computational Science - Angela B. Shiflet 2014-03-30
Computational science is an exciting new field at the intersection of the sciences, computer science, and mathematics because much scientific investigation now involves computing as well as theory and experiment. This textbook provides students with a versatile and accessible introduction to the subject. It assumes only a background in high school algebra, enables instructors to follow tailored pathways through the material, and is the only textbook of its kind designed specifically for an introductory course in the computational science and engineering curriculum. While the text itself is generic, an accompanying website offers tutorials and files in a variety of software packages. This fully updated and expanded edition features two new chapters on agent-based simulations and modeling with matrices, ten new project modules, and an additional module on diffusion. Besides increased treatment of high-performance computing and its applications, the book also includes additional quick review questions with answers, exercises, and individual and team projects. The only introductory textbook of its kind—now fully updated and expanded Features two new chapters on agent-based simulations and modeling with matrices Increased coverage of high-performance computing and its applications Includes additional modules, review questions, exercises, and projects An online instructor's manual with exercise answers, selected project solutions, and a test bank and solutions (available only to professors) An online illustration package is available to professors

Self-Organizing Migrating Algorithm - Donald Davendra 2016-02-04
This book brings together the current state-of-the-art research in Self Organizing Migrating Algorithm (SOMA) as a novel population-based evolutionary algorithm, modeled on the predator-prey relationship, by its leading practitioners. As the first ever book on SOMA, this book is geared towards graduate students, academics and researchers, who are looking for a good optimization algorithm for their applications. This book presents the methodology of SOMA, covering both the real and discrete domains, and its various implementations in different research areas. The easy-to-follow and implement methodology used in the book will make it easier for a reader to implement, modify and utilize SOMA.

Bio-Inspired Fault-Tolerant Algorithms for Network-on-Chip - Muhammad Athar Javed Sethi 2020-03-17
Network on Chip (NoC) addresses the communication requirement of different nodes on System on Chip. The bio-inspired algorithms improve the bandwidth utilization, maximize the throughput and reduce the end-to-end latency and inter-flit arrival time. This book exclusively presents in-depth information regarding bio-inspired algorithms solving real world problems focussing on fault-tolerant algorithms inspired by the biological brain and implemented on NoC. It further documents the bio-inspired algorithms in general and more specifically, in the design of NoC. It gives an exhaustive review and analysis of the NoC architectures developed during the last decade according to various parameters. Key Features: Covers bio-inspired solutions pertaining to Network-on-Chip (NoC) design solving real world examples Includes bio-inspired NoC fault-tolerant algorithms with detail coding examples Lists fault-tolerant algorithms with detailed examples Reviews basic concepts of NoC Discusses NoC architectures developed-to-date

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

Proceedings of International Conference on Artificial Intelligence, Smart Grid and Smart City Applications - L. Ashok Kumar 2020-03-12

Due to the complexity, and heterogeneity of the smart grid and the high volume of information to be processed, artificial intelligence techniques and computational intelligence appear to be some of the enabling technologies for its future development and success. The theme of the book is "Making pathway for the grid of future" with the emphasis on trends in Smart Grid, renewable interconnection issues, planning-operation-control and reliability of grid, real time monitoring and protection, market, distributed generation and power distribution issues, power electronics applications, computer-IT and signal processing applications, power apparatus, power engineering education and industry-institute collaboration. The primary objective of the book is to review the current state of the art of the most relevant artificial intelligence techniques applied to the different issues that arise in the smart grid development.

Controller Tuning Optimization Methods for Multi-Constraints and Nonlinear Systems - Maude Josée Blondin 2021-01-06

This book covers controller tuning techniques from conventional to new optimization methods for diverse control engineering applications. Classical controller tuning approaches are presented with real-world challenges faced in control engineering. Current developments in applying optimization techniques to controller tuning are explained. Case studies of optimization algorithms applied to controller tuning dealing with nonlinearities and limitations like the inverted pendulum and the automatic voltage regulator are presented with performance comparisons. Students and researchers in engineering and optimization interested in optimization methods for controller tuning will utilize this book to apply optimization algorithms to controller tuning, to choose the most suitable optimization algorithm for a specific application, and to develop new optimization techniques for controller tuning.

Computational Intelligence Methods for Super-Resolution in Image Processing Applications - Anand Deshpande 2021-05-28

This book explores the application of deep learning techniques within a particularly difficult computational type of computer vision (CV) problem – super-resolution (SR). The authors present and discuss ways to apply computational intelligence (CI) methods to SR. The volume also explores the possibility of using different kinds of CV techniques to develop and enhance the tools/processes related to SR. The application areas covered include biomedical engineering, healthcare applications, medicine, histology, and material science. The book will be a valuable reference for

anyone concerned with multiple multimodal images, especially professionals working in remote sensing, nanotechnology and immunology at research institutes, healthcare facilities, biotechnology institutions, agribusiness services, veterinary facilities, and universities.

Bioinspired Actuators and Sensors - Minoru Taya 2016-10-13

From experts in engineering and biology, this is the first book to integrate sensor and actuator technology with bioinspired design.

Advances in Chitin/Chitosan Characterization and Applications - Marguerite Rinaudo 2019-04-23

Functional advanced biopolymers have received far less attention than renewable biomass (cellulose, rubber, etc.) used for energy production. Among the most advanced biopolymers known is chitosan. The term chitosan refers to a family of polysaccharides obtained by partial de-N-acetylation from chitin, one of the most abundant renewable resources in the biosphere. Chitosan has been firmly established as having unique material properties as well as biological activities. Either in its native form or as a chemical derivative, chitosan is amenable to being processed—typically under mild conditions—into soft materials such as hydrogels, colloidal nanoparticles, or nanofibers. Given its multiple biological properties, including biodegradability, antimicrobial effects, gene transfectability, and metal adsorption—to name but a few—chitosan is regarded as a widely versatile building block in various sectors (e.g., agriculture, food, cosmetics, pharmacy) and for various applications (medical devices, metal adsorption, catalysis, etc.). This Special Issue presents an updated account addressing some of the major applications, including also chemical and enzymatic modifications of oligos and polymers. A better understanding of the properties that underpin the use of chitin and chitosan in different fields is key for boosting their more extensive industrial utilization, as well as to aid regulatory agencies in establishing specifications, guidelines, and standards for the different types of products and applications.

Swarm Intelligence - Christian Blum 2008-09-24

The book's contributing authors are among the top researchers in swarm intelligence. The book is intended to provide an overview of the subject to novices, and to offer researchers an update on interesting recent developments. Introductory chapters deal with the biological foundations, optimization, swarm robotics, and applications in new-generation telecommunication networks, while the second part contains chapters on more specific topics of swarm intelligence research.

Cyberspace Safety and Security - Jaideep Vaidya 2020-01-03

The two volumes LNCS 11982 and 11983 constitute the proceedings of the 11th International Symposium on Cyberspace Safety and Security, CSS 2019, held in Guangzhou, China, in December 2019. The 61 full papers and 40 short papers presented were carefully reviewed and selected from 235 submissions. The papers cover a broad range of topics in the field of cyberspace safety and security, such as authentication, access control, availability, integrity, privacy, confidentiality, dependability and sustainability issues of cyberspace. They are organized in the following topical sections: network security; system security; information security; privacy preservation; machine learning and security; cyberspace safety; big data and security; and cloud and security;

Bio-inspired Computing Models And Algorithms - Song Tao 2019-04-08

Bio-inspired computing (BIC) focuses on the designs and developments of computer algorithms and models based on biological mechanisms and living phenomena. It is now a major subfield of natural computation that leverages on the recent advances in computer science, biology and mathematics. The ideas provide abundant inspiration to construct high-performance computing models and intelligent algorithms, thus enabling powerful tools to solve real-life problems. Written by world-renowned researchers, this compendium covers the most influential topics on BIC, where the newly-obtained algorithms, developments and results are introduced and elaborated. The potential and valuable directions for further research are addressed as well.

ROBOT 2017: Third Iberian Robotics Conference - Anibal Ollero 2017-11-10

These volumes of "Advances in Intelligent Systems and Computing" highlight papers presented at the "Third Iberian Robotics Conference (ROBOT 2017)". Held from 22 to 24 November 2017 in Seville, Spain, the conference is a part of a series of conferences co-organized by SEIDROB (Spanish Society for Research and Development in Robotics) and SPR (Portuguese Society for Robotics). The conference is focused on Robotics scientific and technological activities in the Iberian Peninsula, although open to research and delegates from other countries. Thus, it has more

than 500 authors from 21 countries. The volumes present scientific advances but also robotic industrial applications, looking to promote new collaborations between industry and academia.

Nature-Inspired Optimization Algorithms - Xin-She Yang 2014-02-17

Nature-Inspired Optimization Algorithms provides a systematic 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 well-chosen 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, as well as multi-objective optimization. This book can serve as an introductory book for graduates, doctoral students and lecturers in computer science, engineering and natural sciences. It can also serve as a source of inspiration for new applications. Researchers and engineers as well as experienced experts will also find it a handy reference. Discusses and summarizes the latest developments in nature-inspired algorithms with comprehensive, timely literature Provides a theoretical understanding as well as practical implementation hints Provides a step-by-step introduction to each algorithm

Information Technology and Computational Physics - Piotr Kulczycki 2017-05-31

A broad spectrum of modern Information Technology (IT) tools, techniques, main developments and still open challenges is presented. Emphasis is on new research directions in various fields of science and technology that are related to data analysis, data mining, knowledge discovery, information retrieval, clustering and classification, decision making and decision support, control, computational mathematics and physics, to name a few. Applications in many relevant fields are presented, notably in telecommunication, social networks, recommender systems, fault detection, robotics, image analysis and recognition, electronics, etc. The methods used by the authors range from high level formal mathematical tools and techniques, through algorithmic and computational tools, to modern metaheuristics.

Applied Optimization and Swarm Intelligence - Eneko Osaba 2021-05-17

This book gravitates on the prominent theories and recent developments of swarm intelligence methods, and their application in both synthetic and real-world optimization problems. The special interest will be placed in those algorithmic variants where biological processes observed in nature have underpinned the core operators underlying their search mechanisms. In other words, the book centers its attention on swarm intelligence and nature-inspired methods for efficient optimization and problem solving. The content of this book unleashes a great opportunity for researchers, lecturers and practitioners interested in swarm intelligence, optimization problems and artificial intelligence.

Ant Colony Optimization - Marco Dorigo 2004-06-04

An overview of the rapidly growing field of ant colony optimization that describes theoretical findings, the major algorithms, and current applications. The complex social behaviors of ants have been much studied by science, and computer scientists are now finding that these behavior patterns can provide models for solving difficult combinatorial optimization problems. The attempt to develop algorithms inspired by one aspect of ant behavior, the ability to find what computer scientists would call shortest paths, has become the field of ant colony optimization (ACO), the most successful and widely recognized algorithmic technique based on ant behavior. This book presents an overview of this rapidly growing field, from its theoretical inception to practical applications, including descriptions of many available ACO algorithms and their uses. The book first describes the translation of observed ant behavior into working optimization algorithms. The ant colony metaheuristic is then introduced and viewed in the general context of combinatorial optimization. This is followed by a detailed description and guide to all major ACO algorithms and a report on current theoretical findings. The book surveys ACO applications now in use, including routing, assignment, scheduling, subset, machine learning, and bioinformatics problems. AntNet, an ACO algorithm designed for the network routing problem, is described in detail. The authors conclude by summarizing the progress in the field and outlining future research directions. Each chapter ends with bibliographic material, bullet points setting out important ideas covered in the chapter, and exercises. Ant Colony Optimization will be of interest to academic and industry researchers, graduate students, and practitioners who wish to learn how to implement

ACO algorithms.

The Extended Specimen - Michael S. Webster 2017-07-20

The Extended Specimen highlights the research potential for ornithological specimens, and is meant to encourage ornithologists poised to initiate a renaissance in collections-based ornithological research. Contributors illustrate how collections and specimens are used in novel ways by adopting emerging new technologies and analytical techniques. Case studies use museum specimens and emerging and non-traditional types of specimens, which are developing new methods for making biological collections more accessible and "usable" for ornithological researchers. Published in collaboration with and on behalf of The American Ornithological Society, this volume in the highly-regarded Studies in Avian Biology series documents the power of ornithological collections to address key research questions of global importance.

Progress in Artificial Intelligence - Paulo Moura Oliveira 2019-08-31

This book constitutes the refereed proceedings of the 19th EPIA Conference on Artificial Intelligence, EPIA 2019, held in Funchal, Madeira, Portugal, in September 2019. The 119 revised full papers and 6 short papers presented were carefully reviewed and selected from a total of 252 submissions. The papers are organized in 18 tracks devoted to the following topics: AIED - Artificial Intelligence in Education, AI4G - Artificial Intelligence for Games, AIoTA - Artificial Intelligence and IoT in Agriculture, AIL - Artificial Intelligence and Law, AIM - Artificial Intelligence in Medicine, AICPDES - Artificial Intelligence in Cyber-Physical and Distributed Embedded Systems, AIPES - Artificial Intelligence in Power and Energy Systems, AITS - Artificial Intelligence in Transportation Systems, ALEA - Artificial Life and Evolutionary Algorithms, AmIA - Ambient Intelligence and Affective Environments, BAAI - Business Applications of Artificial Intelligence, GAI- General AI, IROBOT - Intelligent Robotics, KDBI - Knowledge Discovery and Business Intelligence, KRR - Knowledge Representation and Reasoning, MASTA - Multi-Agent Systems: Theory and Applications, SSM - Social Simulation and Modelling, TeMA - Text Mining and Applications.

Computer Networks and Inventive Communication Technologies - S. Smys 2022

This book is a collection of peer-reviewed best selected research papers presented at 5th International Conference on Computer Networks and Inventive Communication Technologies (ICCNCT 2022). The book covers new results in theory, methodology, and applications of computer networks and data communications. It includes original papers on computer networks, network protocols and wireless networks, data communication technologies, and network security. The proceedings of this conference is a valuable resource, dealing with both the important core and the specialized issues in the areas of next generation wireless network design, control, and management, as well as in the areas of protection, assurance, and trust in information security practice. It is a reference for researchers, instructors, students, scientists, engineers, managers, and industry practitioners for advance work in the area.

Bio-Inspired Algorithms and Devices for Treatment of Cognitive Diseases Using Future Technologies - Gupta, Shweta 2022-02-11

As there are no proper medical tests available to predict certain diseases such as Alzheimer's and Parkinson's at an early stage, there is a need to further study and consider the potential uses of bio- and nature-inspired algorithms and future technologies such as machine learning in correlation to disease detection and treatment. Bio-Inspired Algorithms and Devices for Treatment of Cognitive Diseases Using Future Technologies considers new tools for early detection of cognitive brain diseases using devices and algorithms whose basic concept is taken from nature and discusses design, analysis, and application of various bionics or bio-inspired algorithms. Covering topics such as depression and cognitive science, this publication is an ideal resource for researchers, academicians, industry professionals, psychologists, psychiatrists, nurses, engineers, instructors, and students.

Handbook of Intelligent Computing and Optimization for Sustainable Development - Mukhdeep Singh Manshahia 2022-03-15

HANDBOOK OF INTELLIGENT COMPUTING AND OPTIMIZATION FOR SUSTAINABLE DEVELOPMENT This book provides a comprehensive overview of the latest breakthroughs and recent progress in sustainable intelligent computing technologies, applications, and optimization techniques across various industries. Optimization has received enormous attention along with the rapidly increasing use of communication technology and the development of user-friendly software and artificial intelligence. In almost all human activities, there is a desire to deliver the highest possible results with the least amount of effort.

Moreover, optimization is a very well-known area with a vast number of applications, from route finding problems to medical treatment, construction, finance, accounting, engineering, and maintenance schedules in plants. As far as optimization of real-world problems is concerned, understanding the nature of the problem and grouping it in a proper class may help the designer employ proper techniques which can solve the problem efficiently. Many intelligent optimization techniques can find optimal solutions without the use of objective function and are less prone to local conditions. The 41 chapters comprising the Handbook of Intelligent Computing and Optimization for Sustainable Development by subject specialists, represent diverse disciplines such as mathematics and computer science, electrical and electronics engineering, neuroscience and cognitive sciences, medicine, and social sciences, and provide the reader with an integrated understanding of the importance that intelligent computing has in the sustainable development of current societies. It discusses the emerging research exploring the theoretical and practical aspects of successfully implementing new and innovative intelligent techniques in a variety of sectors, including IoT, manufacturing, optimization, and healthcare. Audience It is a pivotal reference source for IT specialists, industry professionals, managers, executives, researchers, scientists, and engineers seeking current research in emerging perspectives in the field of artificial intelligence in the areas of Internet of Things, renewable energy, optimization, and smart cities.

Advanced Technologies for Solar Photovoltaics Energy Systems - Saad Motahhir 2021-04-26

This book presents a detailed description, analysis, comparison of the latest research and developments in photovoltaic energy. Discussing everything from semiconductors to system integration, and applying various advanced technologies to stand alone and electric utility interfaced in normal and abnormal operating conditions of PV systems, this book provides a thorough introduction to the topic. This book brings together research from around the world, covering the use of technologies such as embedded systems, the Internet of things and blockchain technologies for PV systems for different applications including controllers, solar trackers and cooling systems. The book is of interest to electronic and mechanical engineers, researchers and students in the field of photovoltaics.

International Conference on Innovative Computing and Communications - Deepak Gupta 2020-08-01

This book includes high-quality research papers presented at the Third International Conference on Innovative Computing and Communication (ICICC 2020), which is held at the Shaheed Sukhdev College of Business Studies, University of Delhi, Delhi, India, on 21-23 February, 2020. Introducing the innovative works of scientists, professors, research scholars, students and industrial experts in the field of computing and communication, the book promotes the transformation of fundamental research into institutional and industrialized research and the conversion of applied exploration into real-time applications.

Information Technology, Systems Research, and Computational Physics - Piotr Kulczycki 2019-04-17

This book highlights a broad range of modern information technology tools, techniques, investigations and open challenges, mainly with applications in systems research and computational physics. Divided into three major sections, it begins by presenting specialized calculation methods in the framework of data analysis and intelligent computing. In turn, the second section focuses on application aspects, mainly for systems research, while the final section investigates how various tasks in the basic disciplines—mathematics and physics—can be tackled with the aid of contemporary IT methods. The book gathers selected presentations from the 3rd Conference on Information Technology, Systems Research and Computational Physics (ITSRCP'18), which took place on 2-5 July 2018 in Krakow, Poland. The intended readership includes interdisciplinary scientists and practitioners pursuing research at the interfaces of information technology, systems research, and computational physics.

Power System Fault Diagnosis - Md Shafiullah 2022-01-17

Power System Fault Diagnosis: A Wide Area Measurement Based Intelligent Approach is a comprehensive overview of the growing interests in efficient diagnosis of power system faults to reduce outage duration and revenue losses by expediting the restoration process. This book illustrates intelligent fault diagnosis schemes for power system networks, at both transmission and distribution levels, using data acquired from phasor measurement units. It presents the power grid modeling, fault modeling, feature extraction processes, and various fault

diagnosis techniques, including artificial intelligence techniques, in steps. The book also incorporates uncertainty associated with line parameters, fault information (resistance and inception angle), load demand, renewable energy generation, and measurement noises. Provides step-by-step modeling of power system networks (distribution and transmission) and faults in MATLAB/SIMULINK and real-time digital simulator (RTDS) platforms Presents feature extraction processes using advanced signal processing techniques (discrete wavelet and Stockwell transforms) and an easy-to-understand optimal feature selection method Illustrates comprehensive results in the graphical and tabular formats that can be easily reproduced by beginners Highlights various utility practices for fault location in transmission networks, distribution systems, and underground cables.

International Conference on Innovative Computing and Communications - Ashish Khanna 2021-08-31

This book includes high-quality research papers presented at the Fourth International Conference on Innovative Computing and Communication (ICICC 2021), which is held at the Shaheed Sukhdev College of Business Studies, University of Delhi, Delhi, India, on February 20–21, 2021.

Introducing the innovative works of scientists, professors, research scholars, students and industrial experts in the field of computing and communication, the book promotes the transformation of fundamental research into institutional and industrialized research and the conversion of applied exploration into real-time applications.

Advances in Bioinformatics, Multimedia, and Electronics Circuits and Signals - Lakhmi C. Jain 2019-10-30

The book features selected high-quality papers presented in International Conference on Computing, Power and Communication Technologies 2019 (GUCON 2019), organized by Galgotias University, India, in September 2019. Discussing in detail topics related to electronics devices, circuits and systems; signal processing; and bioinformatics, multimedia and machine learning, the papers in this book provide interesting reading for researchers, engineers, and students.

Bioinspired Structures and Design - Wole Soboyejo 2020-09-17

Master simple to advanced biomaterials and structures with this essential text. Featuring topics ranging from bionanoengineered materials to bio-inspired structures for spacecraft and bio-inspired robots, and covering issues such as motility, sensing, control and morphology, this highly illustrated text walks the reader through key scientific and practical engineering principles, discussing properties, applications and design. Presenting case studies for the design of materials and structures at the nano, micro, meso and macro-scales, and written by some of the leading experts on the subject, this is the ideal introduction to this emerging field for students in engineering and science as well as researchers.

Adaptive Dynamic Programming: Single and Multiple Controllers - Ruizhuo Song 2018-12-28

This book presents a class of novel optimal control methods and games schemes based on adaptive dynamic programming techniques. For systems with one control input, the ADP-based optimal control is designed for different objectives, while for systems with multi-players, the optimal control inputs are proposed based on games. In order to verify the effectiveness of the proposed methods, the book analyzes the properties of the adaptive dynamic programming methods, including convergence of the iterative value functions and the stability of the system under the iterative control laws. Further, to substantiate the mathematical analysis, it presents various application examples, which provide reference to real-world practices.

Machine Learning Paradigms - George A. Tsihrintzis 2020-07-23

At the dawn of the 4th Industrial Revolution, the field of Deep Learning (a sub-field of Artificial Intelligence and Machine Learning) is growing continuously and rapidly, developing both theoretically and towards applications in increasingly many and diverse other disciplines. The book at hand aims at exposing its reader to some of the most significant recent advances in deep learning-based technological applications and consists of an editorial note and an additional fifteen (15) chapters. All chapters in the book were invited from authors who work in the corresponding chapter theme and are recognized for their significant research contributions. In more detail, the chapters in the book are organized into six parts, namely (1) Deep Learning in Sensing, (2) Deep Learning in Social Media and IOT, (3) Deep Learning in the Medical Field, (4) Deep Learning in Systems Control, (5) Deep Learning in Feature Vector Processing, and (6) Evaluation of Algorithm Performance. This research book is directed towards professors, researchers, scientists, engineers and students in computer science-related disciplines. It is also directed

towards readers who come from other disciplines and are interested in becoming versed in some of the most recent deep learning-based technological applications. An extensive list of bibliographic references at the end of each chapter guides the readers to probe deeper into their application areas of interest.

Swarm Intelligence and Evolutionary Algorithms in Healthcare and Drug Development - Sandeep Kumar 2019-11-11

Healthcare sector is characterized by difficulty, dynamism and variety. In 21st century, healthcare domain is surrounded by tons of challenges in terms of Disease detection, prevention, high costs, skilled technicians and better infrastructure. In order to handle these challenges, Intelligent Healthcare management technologies are required to play an effective role in improvising patient's life. Healthcare organizations also need to continuously discover useful and actionable knowledge to gain insight from tons of data for various purposes for saving lives, reducing medical operations errors, enhancing efficiency, reducing costs and making the whole world a healthy world. Applying Swarm Intelligence and Evolutionary Algorithms in Healthcare and Drug Development is essential nowadays. The objective of this book is to highlight various Swarm Intelligence and Evolutionary Algorithms techniques for various medical issues in terms of Cancer Diagnosis, Brain Tumor, Diabetic Retinopathy, Heart disease as well as drug design and development. The book will act as one-stop reference for readers to think and explore Swarm Intelligence and Evolutionary Algorithms seriously for real-time patient diagnosis, as the book provides solutions to various complex diseases found critical for medical practitioners to diagnose in real-world. Key Features: Highlights the importance and applications of Swarm Intelligence and Evolutionary Algorithms in Healthcare industry. Elaborates Swarm Intelligence and Evolutionary Algorithms for Cancer Detection. In-depth coverage of computational methodologies, approaches and techniques based on Swarm Intelligence and Evolutionary Algorithms for detecting Brain Tumour including deep learning to optimize brain tumor diagnosis. Provides a strong foundation for Diabetic Retinopathy detection using Swarm and Evolutionary algorithms. Focuses on applying Swarm Intelligence and Evolutionary Algorithms for Heart Disease detection and diagnosis. Comprehensively covers the role of Swarm Intelligence and Evolutionary Algorithms for Drug Design and Discovery. The book will play a significant role for Researchers, Medical Practitioners, Healthcare Professionals and Industrial Healthcare Research and Development wings to conduct advanced research in Healthcare using Swarm Intelligence and Evolutionary Algorithms techniques.

An IoT Framework for Heart Disease Prediction Based on MDCNN Classifier - Mohammad Ayoub Khan

Many researchers have focused on the diagnosis of heart disease, yet the accuracy of the diagnosis results is low. To address this issue, an IoT framework is proposed to evaluate heart disease more accurately using a Modified Deep Convolutional Neural Network (MDCNN). The smartwatch and heart monitor device that is attached to the patient monitors the blood pressure and electrocardiogram (ECG). The MDCNN is utilized for classifying the received sensor data into normal and abnormal.

Smart Maintenance for Human-Robot Interaction - Bo Xing 2017-09-08

This self-contained book, written by active researchers, presents up-to-date information on smart maintenance strategies for human-robot interaction (HRI) and the associated applications of novel search algorithms in a single volume, eliminating the need to consult scattered resources. Unlike other books, it addresses maintaining a smart HRI from three dimensions, namely, hardware, cyberware, and hybrid-asset management, covering problems encountered in each through a wide variety of representative examples and elaborated illustrations. Further, the diverse mathematical models and intelligent systems constructions make the book highly practical. It enables readers interested in maintenance, robotics, and intelligent systems but perplexed by myriads of interrelated issues to grasp basic methodologies. At the same time, the referenced literature can be used as a roadmap for conducting deeper researches.

Nature-Inspired Computation and Swarm Intelligence - Xin-She Yang 2020-04-24

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

2018 Twentieth International Middle East Power Systems Conference (MEPCON) - IEEE Staff 2018-12-18

The scope of the conference will cover the following 1 Power system planning & operation 2 Electrical machines & drives 3 Power electronics applications 4 High voltage engineering 5 Power system protection & security 6 Power system control and stability 7 Smart grids and microgrids 8 HVDC & FACTS 9 Nuclear power plants 10 Development of transmission and distribution systems 11 Renewable energy systems and grid integration 12 Energy efficiency and management 13 Application of AI in power systems 14 Power quality 15 Power system asset management 16 Development of power system education programs

Emerging Technologies for Agriculture and Environment - Babu Subramanian 2019-06-20

This book comprises select proceedings of the International Conference on Emerging Technologies for Farming - Energy & Environment - Water (ITsFEW 2018). The contents are divided into three parts viz., (i) Developments in Farming, (ii) Energy and Environment, and (iii) Water Conservation and Management. The book aims to provide timely solutions, using innovative and emerging technologies, to the global challenges in agriculture, energy, environment, and water management. Some of the topics covered in this book include remote sensing for smart farming, GIS, irrigation engineering, soil science and agronomy, smart grids, renewable energy, energy management systems, energy storage technologies, biological water treatment, industrial waste water treatment, watershed management and sustainability. Given the wide range of topics discussed, the book will be very useful for students, researchers and practitioners interested in agricultural and environmental engineering.

Swarm Intelligence Algorithms (Two Volume Set) - Adam Slowik 2021-01-26

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.

Computational Vision and Bio-Inspired Computing - S. Smys 2021-06-14

This book includes selected papers from the 4th International Conference on Computational Vision and Bio Inspired Computing (ICCVBIC 2020), held in Coimbatore, India, from November 19 to 20, 2020. This proceedings book presents state-of-the-art research innovations in computational vision and bio-inspired techniques. The book reveals the theoretical and practical aspects of bio-inspired computing techniques, like machine learning, sensor-based models, evolutionary optimization and big data modeling and management that make use of effectual computing processes in the bio-inspired systems. As such it contributes to the novel research that focuses on developing bio-inspired computing solutions for various domains, such as human-computer interaction, image processing, sensor-based single processing, recommender systems and facial recognition, which play an indispensable part in smart agriculture, smart city, biomedical and business intelligence applications.

Colliding Bodies Optimization - A. Kaveh 2015-06-10

This book presents and applies a novel efficient meta-heuristic optimization algorithm called Colliding Bodies Optimization (CBO) for various optimization problems. The first part of the book introduces the concepts and methods involved, while the second is devoted to the applications. Though optimal design of structures is the main topic, two chapters on optimal analysis and applications in constructional management are also included. This algorithm is based on one-dimensional collisions between bodies, with each agent solution being considered as an object or body with mass. After a collision of two moving bodies with specified masses and velocities, these bodies again separate, with new velocities. This collision causes the agents to move toward better positions in the search space. The main algorithm (CBO) is internally parameter independent, setting it apart from previously developed meta-heuristics. This algorithm is enhanced (ECBO) for more efficient applications in the optimal design of structures. The algorithms are implemented in standard computer programming languages (MATLAB and C++) and two main codes are provided for ease of use.