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Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Brain-like Super Intelligence from Bio-electromagnetism Swarm Intelligence and Bio-Inspired Computation Bio-Inspired Artificial Intelligence Bio-Inspired Intelligence for Smart Decision-Making Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Swarm Intelligence and Bio-Inspired Computation Assessing Intelligence Bio-Intelligence Science Bio-Inspired Hybrid Intelligent Systems for Image Analysis and Pattern Recognition Foundations of Computational Intelligence Bio-inspired Neurocomputing On Intelligence-- More Or Less Bio-Inspired Computational Intelligence and Applications Intelligence, Biosecurity and Bioterrorism Machine Intelligence and Bio-inspired Computation Handbook of Research on Swarm Intelligence in Engineering Intelligent Human Systems Integration A New Bio-inspired Optimization Algorithm Based on the Self-defense Mechanism of Plants in Nature Bio-Inspired Computation in Telecommunications Bio-Inspired Credit Risk Analysis Opportunities and Challenges for Next-Generation Applied Intelligence Bio-Inspired Computing for Image and Video Processing Intelligent Robotics and Applications Design and Control of Intelligent Robotic Systems Bio-Inspired Computational Algorithms and Their Applications Intelligence Emerging Building the Future of Innovation on Millions of Years of Natural Intelligence Bio-Inspired Computational Algorithms and Their Applications

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

swarm intelligence and bio inspired computation have become increasing popular in the last two decades bio inspired algorithms such as ant colony algorithms bat algorithms bee algorithms firefly algorithms cuckoo search and particle swarm optimization have been applied in almost every area of science and engineering with a dramatic increase of number of relevant publications this book reviews the latest developments in swarm intelligence and bio inspired computation from both the theory and application side providing a complete resource that analyzes and discusses the latest and future trends in research directions it can help new researchers to carry out timely research and inspire readers to develop new algorithms with its impressive breadth and depth this book will be useful for advanced undergraduate students phd students and lecturers in computer science engineering and science as well as researchers and engineers focuses on the introduction and analysis of key algorithms includes case studies for real world applications contains a balance of theory and applications so readers who are interested in either algorithm or applications will all benefit from this timely book

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

swarm intelligence si and bio inspired computing in general have attracted great interest in almost every area of science engineering and industry over the last two decades in this chapter we provide an overview of some of the most widely used bio inspired algorithms especially those based on si such as cuckoo search firefly algorithm and particle swarm optimization we also analyze the essence of algorithms and their connections to self organization furthermore we highlight the main challenging issues associated with these metaheuristic algorithms with in depth discussions finally we provide some key open problems that need to be addressed in the next decade

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

bio inspired models have taken inspiration from the nature to solve challenging problems in an intelligent manner major aims of such bio inspired models of computation are to propose new unconventional computing architectures and novel problem solving paradigms computing models such as artificial neural network ann genetic algorithm ga and swarm intelligence si are major constituent models of the bio inspired approach applications of these models are ubiquitous and hence proposed to be applied for semantic the chapter discusses fundamentals of these bio inspired constituents along with some heuristic that can be used to design and implement these constituents and briefly surveys recent applications of these models for the semantic the study shows that the objective of the semantic is better met with such approach and the can be accessed in more human oriented way at the end a generic framework for web content filtering based on neuro fuzzy approach is presented by considering online webpages and fuzzy user profile the proposed system classifies the webpages into vague categories using a neural network

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

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

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

in solving many practical mathematical programming applications it is generally preferable to formulate several quantifiably good alternatives that provide very different approaches to the particular problem this is because decision making typically involves complex problems that are riddled with incompatible performance objectives and possess competing design requirements which are very difficult if not impossible to quantify and capture at the time that the supporting decision models are constructed there are invariably unmodeled design issues not apparent at the time of model construction which can greatly impact the acceptability of the model s solutions consequently it is preferable to generate several alternatives that provide multiple disparate perspectives to the problem these alternatives should possess near optimal objective measures with respect to all known modeled objective s but be fundamentally different from each other in terms of the system structures characterized by their decision variables this solution approach is referred to as modeling to generate alternatives mga this chapter provides a synopsis of various mga techniques and demonstrates how biologically inspired mga algorithms are particularly efficient at creating multiple solution alternatives that both satisfy required system performance criteria and yet are maximally different in their decision spaces the efficacy and efficiency of these mga methods are demonstrated using a number of case studies

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

the cuckoo search is a relatively new gradient free optimization algorithm which has been growing in popularity the algorithm aims to replicate the particularly aggressive breeding behavior of cuckoos and it makes use of the lévy flight which is an efficient search pattern in this chapter the original development of the cuckoo search is discussed and a number of modifications that have been made to the basic procedure are compared a number of applications of the cuckoo search are described and some possible future developments of the cuckoo search algorithm are summarized

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

test functions are important to validate and compare the performance of various optimization algorithms in previous years there have been many test or benchmark functions reported in the literature however there is no standard list or set of benchmark functions with diverse properties that algorithms may be tested upon on the other hand any new optimization algorithm should be tested by a diverse range of test or benchmark functions so as to see if it can solve certain types of problems or not for this purpose we compile here 140 benchmark functions for unconstrained optimization problems

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

random walks play an important and central role in metaheuristic and stochastic optimization algorithms the two key components of the search process in metaheuristic algorithms mas are intensification and diversification the overall efficiency of a metaheuristic optimization algorithm depends on a sound balance between these two components in mas exploration is achieved by randomization in combination with a deterministic procedure in this way the newly generated solutions are distributed as diversely as possible in the problem search space in most of the mas randomization is realized using a uniform or gaussian distribution however this is not the only way to achieve randomization in recent years the use of lévy distribution has emerged as an alternative to uniform or gaussian distributions in view of these details this chapter focuses on using lévy flights lfs in the context of global optimization a survey of the most important mas using lfs to achieve intensification and diversification for solving global optimization problems is presented the different components and concepts of lévy flight based mas are discussed and their similarities and differences are analyzed

Brain-like Super Intelligence from Bio-electromagnetism *2013-05-16*

in this chapter we present the convergence analysis and applications of particle swarm optimization algorithm although it is difficult to analyze the convergence of this algorithm we discuss its convergence based on its iterated function system and probabilistic theory the dynamic trajectory of the particle is described based on single individual we also attempt to theoretically prove that the swarm algorithm converges with a probability of 1 toward the global optimal we apply the algorithms to solve the scheduling problem and peer to peer neighbor selection problem this chapter is also concerned to employ the nature inspired optimization methods in machine learning we introduce the swarm algorithm to reoptimize hidden markov models

Swarm Intelligence and Bio-Inspired Computation *2008-08-22*

a comprehensive introduction to new approaches in artificial intelligence and robotics that are inspired by self organizing biological processes and structures new approaches to artificial intelligence spring from the idea that intelligence emerges as much from cells bodies and societies as it does from evolution development and learning traditionally artificial intelligence has been concerned with reproducing the abilities of human brains newer approaches take inspiration from a wider range of biological structures that that are capable of autonomous self organization examples of these new approaches include evolutionary computation and evolutionary electronics artificial neural networks immune systems biorobotics and swarm intelligence to mention only a few this book offers a comprehensive introduction to the emerging field of biologically inspired artificial intelligence that can be used as an upper level text or as a reference for researchers each chapter presents computational approaches inspired by a different biological system each begins with background information about the biological system and then proceeds to develop computational models that make use of biological concepts the chapters cover evolutionary computation and electronics cellular systems neural systems including neuromorphic engineering developmental systems immune systems behavioral systems including several approaches to robotics including behavior based bio mimetic epigenetic and evolutionary robots and collective systems including swarm robotics as well as cooperative and competitive co evolving systems chapters end with a concluding overview and suggested reading

Bio-Inspired Artificial Intelligence *2024-05-14*

in today s complex and fast paced world decision making is critical to problem solving across industries and academia however traditional optimization techniques often need help to cope with the challenges posed by dynamic and intricate environments this limitation hampers decision makers ability to tackle complex problems and seize opportunities effectively as such there is a pressing need for innovative approaches that can enhance decision making processes enabling individuals and organizations to navigate uncertainty and achieve optimal outcomes bio inspired intelligence for smart decision making offers a compelling solution to this challenge by exploring the intersection of bio inspired optimization techniques and decision making this book presents a fresh perspective that can revolutionize decisions the book introduces readers to powerful bio inspired algorithms such as genetic algorithms swarm intelligence and evolutionary strategies through a multidisciplinary lens that encompasses computer science artificial intelligence optimization and decision science these algorithms mimic natural systems efficiency and adaptability offering a robust framework for researchers graduate students and professionals who are addressing complex decision making problems in diverse fields

Bio-Inspired Intelligence for Smart Decision-Making *2013-05-16*

feature selection aims to find the most important information to save computational efforts and data storage we formulated this task as a combinatorial optimization problem since the exponential growth of possible solutions makes an exhaustive search infeasible in this work we propose a new nature inspired feature selection technique based on bats behavior namely binary bat algorithm the wrapper approach combines the power of exploration of the bats together with the speed of the optimum path forest classifier to find a better data representation experiments in public datasets have shown that the proposed technique can indeed improve the effectiveness of the optimum path forest and outperform some well known swarm based techniques

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

artificial plant optimization algorithm apoa is a novel evolutionary strategy inspired by tree s growing process in this chapter the methodologies of prototypal apoa and its updated version are illustrated first the primary framework is introduced by accounting for photosynthesis and phototropism phenomena since some important factors are ignored during mimicking branch s growing the optimization is sometimes misleading and time consuming therefore the standard version is developed by adding geotropism mechanism and apical dominance operator the quality of the proposed technique is verified by two applications on artificial neural network training and toy model of protein folding simulation results are consistent with reported numerical data indicating that the new optimization approach is valid and shows broad application in other fields

Swarm Intelligence and Bio-Inspired Computation 2013-05-16

a new metaheuristic optimization algorithm called krill herd kh has been recently proposed by gandomi and alavi in this study kh is introduced for structural optimization for more verification kh is subsequently applied to three design problems reported in the literature the performance of the kh algorithm is further compared with various algorithms representative of the state of the art in the area the comparisons show that the results obtained by kh can be better than the best solutions obtained by the existing methods in these three case studies

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

advanced inventory management in complex supply chains requires effective and robust nonlinear optimization due to the stochastic nature of supply and demand variations application of estimated gradients can boost up the convergence of particle swarm optimization pso algorithm but classical gradient calculation cannot be applied to stochastic and uncertain systems in these situations monte carlo mc simulation can be applied to determine the gradient we developed a memory based algorithm where instead of generating and evaluating new simulated samples the stored and shared former function evaluations of the particles are sampled to estimate the gradients by local weighted least squares regression the performance of the resulted regional gradient based pso is verified by several benchmark problems and in a complex application example where optimal reorder points of a supply chain are determined

Swarm Intelligence and Bio-Inspired Computation *2013-05-16*

most swarm intelligence algorithms were devised for continuous optimization problems however they have been adapted for discrete optimization as well with applications in different domains this survey aims at providing an updated review of research of swarm intelligence algorithms for discrete optimization problems comprising combinatorial or binary the biological inspiration that motivated the creation of each swarm algorithm is introduced and later the discretization and encoding methods are used to adapt each algorithm for discrete problems methods are compared for different classes of problems and a critical analysis is provided pointing to future trends

Swarm Intelligence and Bio-Inspired Computation 2013-05-16

automatic music composition has blossomed with the introduction of intelligent methodologies in computer science thereby many methodologies for automatic music composition have been or could be described as intelligent but what exactly is it that makes them intelligent furthermore is there any categorization of intelligent music composition imc methodologies that is both consistent and descriptive this chapter aims to provide some insights on what imc methodologies are through proposing and analyzing a detailed categorization of them toward this perspective methodologies that incorporate bioinspired intelligent algorithms such as cellular automata l systems genetic algorithms swarm intelligence among others as well as their combinations are considered and briefly reviewed at the same time a consistent categorization of these methodologies is proposed taking into account the utilization of their intelligent algorithm in accordance to their overall compositional aims to this end three main categories can be defined the unsupervised the supervised and the interactive imc methodologies

Swarm Intelligence and Bio-Inspired Computation *1998-04-09*

offering an alternative approach to the current models of assessing intelligence this volume presents a comprehensive and informed understanding of the biological and cultural influences on intellectual behavior in assessing intelligence authors eleanor armour thomas and sharon ann gopaul mcnicol propose a bio cultural model for intelligence assessment this volume begins by examining the issues pertaining to intellectual assessment the nature of intelligence and the biological influences on cognition it then explores a new model for assessing all childrenùthe four tier bio cultural assessment system and it presents an evaluation of that system finally it offers training suggestions for teachers parents counselors and psychologists for enhancing the intellectual potential of all children and it presents implications for future research and clinical work as well as a vision for policymakers to ensure culturally sensitive assessment assessing intelligence offers a diverse perspective from the fields of clinical psychology school psychology education and education psychology it will be a valuable resource for practitioners researchers and policymakers in the fields of general psychology clinical psychology education social psychology cross cultural psychology multicultural psychology political science and cultural studies

Assessing Intelligence *2017-11*

today it is considered that intelligence includes at least two skills the ability to memorize and store knowledge and the ability to process knowledge the person or machine without any knowledge cannot be considered intelligent the ability of learning acquisition of new knowledge is also one of the aspects of the intelligence although we can classify it as an ability to solve problems as an intelligent feature we can also consider the ability to communicate with other intelligent beings for the concept of intelligence two questions are essential the question of knowledge and the reasoning making conclusions and this corresponds to the terms of a knowledge base and a reasoning process the component of reasoning inference also represents a kind of knowledge it is knowledge about the process of carrying out new information from an existing knowledge base this edition covers different topics from bio intelligence science and application of bio intelligence in different domains the bio medical domain the learning the medicine etc section 1 focuses on biological aspects of the intelligence describing biological vs artificial intelligence brain as an emergent finite automaton biological neural network structure and spike activity prediction based on multi neuron spike train data an experiment in use of brain computer interfaces for cognitive researches and chessboard model of human brain and an application on memory capacity section 2 focuses on topics from neuroscience describing patterns discovery in brain signals using decision trees an interactive immersive tool for brain education art and neuro therapy analyzing brain functions by subject classification of functional near infrared spectroscopy data using convolutional neural networks analysis modeling neuromorphic persistent firing networks and creativity as central to critical reasoning and the facilitative role of moral education section 3 focuses on pattern recognition in neuro and medical applications describing brain k for structural image processing creating electrical models of the human head application of machine learning in postural control kinematics for the diagnosis of alzheimer s disease and semi supervised clustering by iterative partition and regression with neuroscience applications section 4 focuses on neural networks applications describing quantum inspired neural

networks with application training feedforward neural networks using symbiotic organisms search algorithm artificial intelligence for speech recognition based on neural networks and deep recurrent neural network based auto encoders for acoustic novelty detection

Bio-Intelligence Science *2009-11-19*

bio inspired hybrid intelligent systems for image analysis and pattern recognition comprises papers on diverse aspects of bio inspired models soft computing and hybrid intelligent systems the articles are divided into four main parts the first one consists of papers that propose new fuzzy and bio inspired models to solve general problems the second part deals with the main theme of modular neural networks in pattern recognition which are basically papers using bio inspired techniques the third part contains papers that apply hybrid intelligent systems to the problem of time series analysis and prediction while the fourth one shows papers dealing with bio inspired models in optimization and robotics applications an edited book in which both theoretical and application aspects are covered

Bio-Inspired Hybrid Intelligent Systems for Image Analysis and Pattern Recognition *2009-04-30*

foundations of computational intelligence volume 4 bio inspired data mining theoretical foundations and applications recent advances in the computing and electronics technology particularly in sensor devices databases and distributed systems are leading to an exponential growth in the amount of data stored in databases it has been estimated that this amount doubles every 20 years for some applications this increase is even steeper databases storing dna sequence for example are doubling their size every 10 months this growth is occurring in several applications areas besides bioinformatics like financial transactions government data environmental mo toring satellite and medical images security data and web as large organizations recognize the high value of data stored in their databases and the importance of their data collection to support decision making there is a clear demand for phisticated data mining tools data mining tools play a key role in the extraction of useful knowledge from databases they can be used either to confirm a parti lar hypothesis or to automatically find patterns in the second case which is lated to this book the goal may be either to describe the main patterns present in dataset what is known as descriptive data mining or to find patterns able to p dict behaviour of specific attributes or features known as predictive data mining while the first goal is associated with tasks like clustering summarization and association the second is found in classification and regression problems

Foundations of Computational Intelligence *2020-07-21*

this book covers the latest technological advances in neuro computational intelligence in biological processes where the primary focus is on biologically inspired neuro computational techniques the theoretical and practical aspects of biomedical neural computing brain inspired computing bio computational models artificial intelligence ai and machine learning ml approaches in biomedical data analytics are covered along with their qualitative and quantitative features the contents cover numerous computational applications methodologies and emerging challenges in the field of bio soft computing and bio signal processing the authors have taken meticulous care in describing the fundamental concepts identifying the research gap and highlighting the problems with the strategical computational approaches to address the ongoing challenges in bio inspired models and algorithms given the range of topics covered this book can be a valuable resource for students researchers as well as practitioners interested in the rapidly evolving field of neurocomputing and biomedical data analytics

Bio-inspired Neurocomputing *1990*

this monograph explores problems with existing theories of intelligence offering a critique of what the author calls conceptual myopia that has influenced the way researchers think about intelligence and its development

On Intelligence-- More Or Less *2007-08-28*

this book is part of a two volume work that constitutes the refereed proceedings of the international conference on life system modeling and simulation lsms 2007 held in shanghai china september 2007 coverage includes advanced neural network theory advanced evolutionary computing theory ant colonies and particle swarm optimization intelligent modeling monitoring and control of complex nonlinear systems as well as biomedical signal processing imaging and visualization

Bio-Inspired Computational Intelligence and Applications 2018-09-18

this book explores how potential bio threats and risks may evolve post 9 11 given the rapid changes in biotechnology and synthetic biology it also explores what role intelligence communities can play in understanding threats and risks it argues that although bio threats and risks are largely low probability and high impact in nature intelligence in five eyes countries remain insufficiently prepared to understand them this book identifies key areas where intelligence reforms need to take place including a more strategic and systematic collaboration between national security law enforcement intelligence and the scientific community it is aimed at intelligence analysts those in the scientific community working on health security threats policy makers and researchers working on biosecurity and bioterrorism threats and risks

Intelligence, Biosecurity and Bioterrorism *2014*

swarm intelligence has recently emerged as a next generation methodology belonging to the class of evolutionary computing as a result scientists have been able to explain and understand real life processes and practices that previously remained unexplored the handbook of research on swarm intelligence in engineering presents the latest research being conducted on diverse topics in intelligence technologies such as swarm intelligence machine intelligence optical engineering and signal processing with the goal of advancing knowledge and applications in this rapidly evolving field the enriched interdisciplinary contents of this book will be a subject of interest to the widest forum of faculties existing research communities and new research aspirants from a multitude of disciplines and trades

Machine Intelligence and Bio-inspired Computation *2015-04-30*

this book reports on research on innovative human systems integration and human machine interaction with an emphasis on artificial intelligence and automation as well as computational modeling and simulation it covers a wide range of applications in the area of design construction and operation of products systems and services including lifecycle development and human technology interaction the book describes advanced methodologies and tools for evaluating and improving interface usability new models as well as case studies and best practices in virtual augmented and mixed reality systems with a special focus on dynamic environments it also discusses different factors concerning the human hardware and artificial intelligence software based on the proceedings of the 1st international conference on intelligent human systems integration ihsi 2018 held on january 7 9 2018 in dubai united arab emirates the book also examines the forces that are currently shaping the nature of computing and cognitive systems such as the need for decreasing hardware costs the importance of infusing intelligence and automation and the related trend toward hardware miniaturization and power reduction the necessity for a better assimilation of computation in the environment and the social concerns regarding access to computers and systems for people with special needs it offers a timely survey and a practice oriented reference guide to policy and decision makers human factors engineers systems developers and users alike

Handbook of Research on Swarm Intelligence in Engineering *2017-12-30*

this book presents a new meta heuristic algorithm inspired by the self defense mechanisms of plants in nature numerous published works have demonstrated the various self defense mechanisms survival strategies plants use to protect themselves against predatory organisms such as herbivorous insects the proposed algorithm is based on the predator prey mathematical model originally proposed by lotka and volterra consisting of two nonlinear first order differential equations which allow the growth of two interacting populations prey and predator to be modeled the proposed meta heuristic is able to produce excellent results in several sets of benchmark optimization problems further fuzzy logic is used for dynamic parameter adaptation in the algorithm

Intelligent Human Systems Integration *2018-12-30*

bio inspired computation especially those based on swarm intelligence has become increasingly popular in the last decade bio inspired computation in telecommunications reviews the latest developments in bio inspired computation from both theory and application as they relate to telecommunications and image processing providing a complete resource that analyzes and discusses the latest and future trends in research directions written by recognized experts this is a must have guide for researchers telecommunication engineers computer scientists and phd students

A New Bio-inspired Optimization Algorithm Based on the Self-defense Mechanism of Plants in Nature *2015-02-11*

credit risk analysis is one of the most important topics in the field of financial risk management due to recent financial crises and regulatory concern of basel ii credit risk analysis has been the major focus of financial and banking industry especially for some credit granting institutions such as commercial banks and credit companies the ability to discriminate good customers from bad ones is crucial the need for reliable quantitative models that predict defaults accurately is imperative so that the interested parties can take either preventive or corrective action hence credit risk analysis becomes very important for sustainability and profit of enterprises in such backgrounds this book tries to integrate recent emerging support vector machines and other computational intelligence techniques that replicate the principles of bio inspired information processing to create some innovative methodologies for credit risk analysis and to provide decision support information for interested parties

Bio-Inspired Computation in Telecommunications *2008-04-24*

the term artificial intelligence has been used since 1956 and has become a very popular research field generally it is the study of the computations that enable a system to perceive reason and act in the early days it was expected to achieve the same intelligent behavior as a human but found impossible at last its goal was thus revised to design and use of intelligent methods to make systems more ef cient at solving problems the term applied intelligence was thus created to represent its practicality it emphasizes applications of applied intelligent systems to solve real life problems in all areas including engineering science industry automation robotics business finance medicine bio medicine bio informatics cyberspace and man machine interactions to endow the intelligent behavior of a system many useful and interesting techniques have been developed some of them are even borrowed from the na ral observation and biological phenomenon neural networks and evolutionary computation are two examples of them besides some other heuristic approaches like data mining adaptive control intelligent manufacturing autonomous agents bio informatics reasoning computer vision decision support systems expert s tems fuzzy logic robots intelligent interfaces internet technology planning and scheduling are also commonly used in applied intelligence

Bio-Inspired Credit Risk Analysis *2009-05-19*

in recent years bio inspired computational theories and tools have developed to assist people in extracting knowledge from high dimensional data these differ in how they take a more evolutionary approach to learning as opposed to traditional artificial intelligence ai and what could be described as creationist methods instead bio inspired computing takes a bottom up de centralized approach that often involves the method of specifying a set of simple rules a set of simple organisms which adhere to those rules and of iteratively applying those rules bio inspired computing for image and video processing covers interesting and challenging new theories in image and video processing it addresses the growing demand for image and video processing in diverse application areas such as secured biomedical imaging biometrics remote sensing texture understanding pattern recognition content based image retrieval and more this book is perfect for students following this topic at both undergraduate and postgraduate level it will also prove indispensable to researchers who have an interest in image processing using bio inspired computing

Opportunities and Challenges for Next-Generation Applied Intelligence 2018-01-02

the two volume set lnai 7101 and 7102 constitute the refereed proceedings of the 4th international conference on intelligent robotics and applications icira 2011 held in aachen germany in november 2011 the 122 revised full papers presented were thoroughly reviewed and selected from numerous submissions they are organized in topical sections on progress in indoor uav robotics intelligence industrial robots rehabilitation robotics mechanisms and their applications multi robot systems robot mechanism and design parallel kinematics parallel kinematics machines and parallel robotics handling and manipulation tangibility in human machine interaction navigation and localization of mobile robot a body for the brain embodied intelligence in bio inspired robotics intelligent visual systems self optimising production systems computational intelligence robot control systems human robot interaction manipulators and applications stability dynamics and interpolation evolutionary robotics bio inspired robotics and image processing applications

Bio-Inspired Computing for Image and Video Processing *2011-11-29*

with the increasing applications of intelligent robotic systems in various elds the sign and control of these systems have increasingly attracted interest from researchers this edited book entitled design and control of intelligent robotic systems in the book series of studies in computational intelligence is a collection of some advanced research on design and control of intelligent robots the works presented range in scope from design methodologies to robot development various design approaches and al rithms such as evolutionary computation neural networks fuzzy logic learning etc are included we also would like to mention that most studies reported in this book have been implemented in physical systems an overview on the applications of computational intelligence in bio inspired robotics is given in chapter 1 by m begum and f karray with highlights of the recent progress in bio inspired robotics research and a focus on the usage of computational intelligence tools to design human like cognitive abilities in the robotic systems in chapter 2 lisa l grant and ganesh k venayagamoorthy present greedy search particle swarm optimization and fuzzy logic based strategies for navigating a swarm of robots for target search in a hazardous environment with potential applications in high risk tasks such as disaster recovery and hazardous material detection

Intelligent Robotics and Applications 2009-01-22

bio inspired computational algorithms are always hot research topics in artificial intelligence communities biology is a bewildering source of inspiration for the design of intelligent artifacts that are capable of efficient and autonomous operation in unknown and changing environments it is difficult to resist the fascination of creating artifacts that display elements of lifelike intelligence thus needing techniques for control optimization prediction security design and so on bio inspired computational algorithms and their applications is a compendium that addresses this need it integrates contrasting techniques of genetic algorithms artificial immune systems particle swarm optimization and hybrid models to solve many real world problems the works presented in this book give insights into the creation of innovative improvements over algorithm performance potential applications on various practical tasks and combination of different techniques the book provides a reference to researchers practitioners and students in both artificial intelligence and engineering communities forming a foundation for the development of the field

Design and Control of Intelligent Robotic Systems *2012-03-07*

an investigation of intelligence as an emergent phenomenon integrating the perspectives of evolutionary biology neuroscience and artificial intelligence emergence the formation of global patterns from solely local interactions is a frequent and fascinating theme in the scientific literature both popular and academic in this book keith downing undertakes a systematic investigation of the widespread if often vague claim that intelligence is an emergent phenomenon downing focuses on neural networks both natural and artificial and how their adaptability in three time frames phylogenetic evolutionary ontogenetic developmental and epigenetic lifetime learning underlie the emergence of cognition integrating the perspectives of evolutionary biology neuroscience and artificial intelligence downing provides a series of concrete examples of neurocognitive emergence doing so he offers a new motivation for the expanded use of bio inspired concepts in artificial intelligence ai in the subfield known as bio ai one of downing s central claims is that two key concepts from traditional ai search and representation are key to understanding emergent intelligence as well he first offers introductory chapters on five core concepts emergent phenomena formal search processes representational issues in bio ai artificial neural networks anns and evolutionary algorithms eas intermediate chapters delve deeper into search representation and emergence in anns eas and evolving brains finally advanced chapters on evolving artificial neural networks and information theoretic approaches to assessing emergence in neural systems synthesize earlier topics to provide some perspective predictions and pointers for the future of bio ai

Bio-Inspired Computational Algorithms and Their Applications *2015-05-29*

despite endless change and disruption massive upheaval and cosmic collisions nature has survived the worst of times and thrived in the best of them for 3 8 billion years she knows what works what lasts and what contributes to the future of life on earth she is the undisputed master of continuous innovation adaptation and ultimately regeneration what if we humans could tap into the power of the natural intelligence that stood the test of time and model our businesses after the proven success stories of nature what if we could fast track innovation and develop responsible products and agile organisations we might learn to become life friendly and self renewing right where we are and transform our current degenerative value system into a regenerative one this may sound like science fiction but is already happening in this book leen gorissen phd in biology covers breakthrough insights from the life sciences and how these change the way we look at change and innovation she shares some of the most advanced thinking and novelties in bio inspired innovation covering disciplines like biomimicry biophilia permaculture living systems thinking nature based solutions and regenerative design and clusters these nature inspired disciplines under the umbrella of ni because nature is the largest r d project in history millions of years of field tests have led to designs that outclass any man made design in terms of efficiency effectiveness adaptability resiliency and endurance by tapping into the potential of ni the business world can become an important engine of planetary regeneration and a beacon of creativity and meaningful work spreading hope and ingenuity not despair and burn out

Intelligence Emerging 2020-04-30

bio inspired computational algorithms are always hot research topics in artificial intelligence communities biology is a bewildering source of inspiration for the design of intelligent artifacts that are capable of efficient and autonomous operation in unknown and changing environments it is difficult to resist the fascination of creating artifacts that display elements of lifelike intelligence thus needing techniques for control optimization prediction security design and so on bio inspired computational algorithms and their applications is a compendium that addresses this need it integrates contrasting techniques of genetic algorithms artificial immune systems particle swarm optimization and hybrid models to solve many real world problems the works presented in this book give insights into the creation of innovative improvements over algorithm performance potential applications on various practical tasks and combination of different techniques the book provides a reference to researchers practitioners and students in both artificial intelligence and engineering communities forming a foundation for the development of the field

Building the Future of Innovation on Millions of Years of Natural Intelligence *2012*

Bio-Inspired Computational Algorithms and Their Applications

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