Zong Woo Geem (Ed.)

Music-Inspired Harmony Search Algorithm

Theory and Applications

Music Inspired Harmony Search Algorithm Theory And Applications Studies In Computational Intelligence

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Music Inspired Harmony Search Algorithm Theory And Applications Studies In Computational Intelligence:

Music-Inspired Harmony Search Algorithm Zong Woo Geem,2009-05-12 Calculus has been used in solving many scientific and engineering problems For optimization problems however the differential calculus technique sometimes has a drawback when the objective function is step wise discontinuous or multi modal or when decision variables are discrete rather than continuous Thus researchers have recently turned their interests into metaheuristic algorithms that have been inspired by natural phenomena such as evolution animal behavior or metallic annealing This book especially focuses on a music inspired metaheuristic algorithm harmony search Interestingly there exists an analogy between music and optimization each musical instrument corresponds to each decision variable musical note corresponds to variable value and harmony corresponds to solution vector Just like musicians in Jazz improvisation play notes randomly or based on experiences in order to find fantastic harmony variables in the harmony search algorithm have random values or previously memorized good values in order to find optimal solution   Recent Advances in Harmony Search Algorithm Zong Woo Geem,2010-01-12 Nowadays music inspired phenomenon mimicking harmony search algorithm is fast growing with many applications One of key success factors of the algorithm is the employment of a novel stochastic derivative which can be used even for discrete variables Instead of traditional calculus based gradient the algorithm utilizes musician s experience as a derivative in searching for an optimal solution This can be a new paradigm and main reason in the successes of various applications The goal of this book is to introduce major advances of the harmony search algorithm in recent years The book contains 14 chapters with the following subjects State of the art in the harmony search algorithm structure robotics robot terrain and manipulator trajectory visual tracking web text data mining power flow planning fuzzy control system hybridization with Taguchi method or SQP method groundwater management irrigation logistics timetabling and bioinformatics RNA structure prediction This book collects the above mentioned theory and applications which are dispersed in various technical publications so that readers can have a good grasp of current status of the harmony search algorithm and foster new breakthroughs in their fields using the algorithm   **Nature-Inspired Computing** Nazmul H. Siddique,Hojjat Adeli,2017-05-19 Nature Inspired Computing Physics and Chemistry Based Algorithms provides a comprehensive introduction to the methodologies and algorithms in nature inspired computing with an emphasis on applications to real life engineering problems The research interest for Nature inspired Computing has grown considerably exploring different phenomena observed in nature and basic principles of physics chemistry and biology The discipline has reached a mature stage and the field has been well established This endeavour is another attempt at investigation into various computational schemes inspired from nature which are presented in this book with the development of a suitable framework and industrial applications Designed for senior undergraduates postgraduates research students and professionals the book is written at a comprehensible level for students who have some basic knowledge of calculus and differential equations and some exposure to optimization theory Due to the

focus on search and optimization the book is also appropriate for electrical control civil industrial and manufacturing engineering business and economics students as well as those in computer and information sciences With the mathematical and programming references and applications in each chapter the book is self contained and can also serve as a reference for researchers and scientists in the fields of system science natural computing and optimization   Computational Optimization and Applications in Engineering and Industry Xin-She Yang,Slawomir Koziel,2011-06-19 Contemporary design in engineering and industry relies heavily on computer simulation and efficient algorithms to reduce the cost and to maximize the performance and sustainability as well as profits and energy efficiency Solving an optimization problem correctly and efficiently requires not only the right choice of optimization algorithms and simulation methods but also the proper implementation and insight into the problem of interest This book consists of ten self contained detailed case studies of real world optimization problems selected from a wide range of applications and contributed from worldwide experts who are working in these exciting areas Optimization topics and applications include gas and water supply networks oil field production optimization microwave engineering aerodynamic shape design environmental emergence modelling structural engineering waveform design for radar and communication systems parameter estimation in laser experiment and measurement engineering materials and network scheduling These case studies have been solved using a wide range of optimization techniques including particle swarm optimization genetic algorithms artificial bee colony harmony search adaptive error control derivative free pattern search surrogate based optimization variable fidelity modelling as well as various other methods and approaches This book is a practical guide to help graduates and researchers to carry out optimization for real world applications More advanced readers will also find it a helpful reference and aide memoire

Nature-inspired Metaheuristic Algorithms Xin-She Yang,2010 Modern metaheuristic algorithms such as particle swarm optimization and cuckoo search start to demonstrate their power in dealing with tough optimization problems and even NP hard problems This book reviews and introduces the state of the art nature inspired metaheuristic algorithms for global optimization including ant and bee algorithms bat algorithm cuckoo search differential evolution firefly algorithm genetic algorithms harmony search particle swarm optimization simulated annealing and support vector machines In this revised edition we also include how to deal with nonlinear constraints Worked examples with implementation have been used to show how each algorithm works This book is thus an ideal textbook for an undergraduate and or graduate course as well as for self study As some of the algorithms such as the cuckoo search and firefly algorithms are at the forefront of current research this book can also serve as a reference for researchers   *Computational Intelligence Methods for Sentiment Analysis in Natural Language Processing Applications* D. Jude Hemanth,2024-01-19 Sentiment Analysis has become increasingly important in recent years for nearly all online applications Sentiment Analysis depends heavily on Artificial Intelligence AI technology wherein computational intelligence approaches aid in deriving the opinions emotions of human

beings With the vast increase in Big Data computational intelligence approaches have become a necessity for Natural Language Processing and Sentiment Analysis in a wide range of decision making application areas The applications of Sentiment Analysis are enormous ranging from business to biomedical and clinical applications However the combination of AI methods and Sentiment Analysis is one of the rarest commodities in the literature The literatures either gives more importance to the application alone or to the AI CI methodology Computational Intelligence for Sentiment Analysis in Natural Language Processing Applications provides a solution to this problem through detailed technical coverage of AI based Sentiment Analysis methods for various applications The authors provide readers with an in depth look at the challenges and solutions associated with the different types of Sentiment Analysis including case studies and real world scenarios from across the globe Development of scientific and enterprise applications are covered which will aid computer scientists in building practical real world AI based Sentiment Analysis systems Includes basic concepts technical explanations and case studies for in depth explanation of the Sentiment Analysis Aids computer scientists in developing practical real world AI based Sentiment Analysis systems Provides readers with real world development applications of AI based Sentiment Analysis including transfer learning for opinion mining from pandemic medical data sarcasm detection using neural networks in human computer interaction and emotion detection using the random forest algorithm   Nature-Inspired Design of Hybrid Intelligent Systems Patricia Melin,Oscar Castillo,Janusz Kacprzyk,2016-12-08 This book highlights recent advances in the design of hybrid intelligent systems based on nature inspired optimization and their application in areas such as intelligent control and robotics pattern recognition time series prediction and optimization of complex problems The book is divided into seven main parts the first of which addresses theoretical aspects of and new concepts and algorithms based on type 2 and intuitionistic fuzzy logic systems The second part focuses on neural network theory and explores the applications of neural networks in diverse areas such as time series prediction and pattern recognition The book s third part presents enhancements to meta heuristics based on fuzzy logic techniques and describes new nature inspired optimization algorithms that employ fuzzy dynamic adaptation of parameters while the fourth part presents diverse applications of nature inspired optimization algorithms In turn the fifth part investigates applications of fuzzy logic in diverse areas such as time series prediction and pattern recognition The sixth part examines new optimization algorithms and their applications Lastly the seventh part is dedicated to the design and application of different hybrid intelligent systems   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 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 **Advances in Machine Learning and Computational Intelligence** Srikanta Patnaik,Xin-She Yang,Ishwar K. Sethi,2020-07-25 This book gathers selected high quality papers presented at the International Conference on Machine Learning and Computational Intelligence ICMLCI 2019 jointly organized by Kunming University of Science and Technology and the Interscience Research Network Bhubaneswar India from April 6 to 7 2019 Addressing virtually all aspects of intelligent systems soft computing and machine learning the topics covered include prediction data mining information retrieval game playing robotics learning methods pattern visualization automated knowledge acquisition fuzzy stochastic and probabilistic computing neural computing big data social networks and applications of soft computing in various areas Design of Intelligent Systems Based on Fuzzy Logic, Neural Networks and Nature-Inspired Optimization Patricia Melin,Oscar Castillo,Janusz Kacprzyk,2015-06-12 This book presents recent advances on the design of intelligent systems based on fuzzy logic neural networks and nature inspired optimization and their application in areas such as intelligent control and robotics pattern recognition time series prediction and optimization of complex problems The book is organized in eight main parts which contain a group of papers around a similar subject The first part consists of papers with the main theme of theoretical aspects of fuzzy logic which basically consists of papers that propose new concepts and algorithms based on fuzzy systems The second part contains papers with the main theme of neural networks theory which are basically papers dealing with new concepts and algorithms in neural networks The third part contains papers describing applications of neural networks in diverse areas such as time series prediction and pattern recognition The fourth part contains papers describing new nature inspired optimization algorithms The fifth part presents diverse applications of nature inspired optimization algorithms The sixth part contains papers describing new optimization algorithms The seventh part contains papers describing applications of fuzzy logic in diverse areas such as time series prediction and pattern recognition Finally the eighth part contains papers that present enhancements to meta heuristics based on fuzzy logic techniques **Fuzzy Logic Augmentation of Neural and Optimization Algorithms: Theoretical Aspects and Real Applications** Oscar Castillo,Patricia Melin,Janusz Kacprzyk,2018-01-10 This book comprises papers on diverse aspects of fuzzy logic neural networks and nature inspired optimization meta heuristics and their application in various areas such as intelligent control and robotics pattern recognition medical diagnosis time series prediction and optimization of complex problems The book is organized into seven main parts each with a collection of papers on a similar

subject The first part presents new concepts and algorithms based on type 2 fuzzy logic for dynamic parameter adaptation in meta heuristics The second part discusses network theory and applications and includes papers describing applications of neural networks in diverse areas such as time series prediction and pattern recognition The third part addresses the theory and practice of meta heuristics in different areas of application while the fourth part describes diverse fuzzy logic applications in the control area which can be considered as intelligent controllers The next two parts explore applications in areas such as time series prediction and pattern recognition and new optimization and evolutionary algorithms and their applications respectively Lastly the seventh part addresses the design and application of different hybrid intelligent systems

Advances in Soft Computing and Its Applications Félix Castro,Alexander Gelbukh,Miguel González,2013-11-18 The two volume set LNAI 8265 and LNAI 8266 constitutes the proceedings of the 12th Mexican International Conference on Artificial Intelligence MICAI 2013 held in Mexico City Mexico in November 2013 The total of 85 papers presented in these proceedings were carefully reviewed and selected from 284 submissions The first volume deals with advances in artificial intelligence and its applications and is structured in the following five sections logic and reasoning knowledge based systems and multi agent systems natural language processing machine translation and bioinformatics and medical applications The second volume deals with advances in soft computing and its applications and is structured in the following eight sections evolutionary and nature inspired metaheuristic algorithms neural networks and hybrid intelligent systems fuzzy systems machine learning and pattern recognition data mining computer vision and image processing robotics planning and scheduling and emotion detection sentiment analysis and opinion mining **Sheet Metal Forming Optimization** Ganesh M. Kakandikar,Vilas M. Nandedkar,2017-10-16 Automotive and aerospace components utensils and many other products are manufactured by a forming drawing process on press machines of very thin sheet metal 0 8 to 1 2 mm It is imperative to study the effect of all involved parameters on output of this type of manufacturing process This book offers the readers with application and suitability of various evolutionary swarm and bio inspired optimization algorithms for sheet metal forming processes Book initiates by presenting basics of metal forming formability followed by discussion of process parameters in detail prominent modes of failure basics of optimization and various bioinspired approaches followed by optimization studies on various industrial components applying bioinspired optimization algorithms Key Features Focus on description of basic investigation of metal forming as well as evolutionary optimization Presentation of innovative optimization methodologies to close the gap between those formulations and industrial problems aimed at industrial professionals Includes mathematical modeling of drawing forming process Discusses key performance parameters such as Thinning Fracture and Wrinkling Includes both numerical and experimental analysis *Advances in Artificial Intelligence and Its Applications* Obdulia Pichardo Lagunas,Oscar Herrera Alcántara,Gustavo Arroyo Figueroa,2015-11-19 The two volume set LNAI 9413 9414 constitutes the proceedings of the 14th Mexican International Conference on Artificial Intelligence MICAI 2015 held in

Cuernavaca Morelos Mexico in October 2015 The total of 98 papers presented in these proceedings was carefully reviewed and selected from 297 submissions They were organized in topical sections named natural language processing logic and multi agent systems bioinspired algorithms neural networks evolutionary algorithms fuzzy logic machine learning and data mining natural language processing applications educational applications biomedical applications image processing and computer vision search and optimization forecasting and intelligent applications **Handbook of Research on Artificial Intelligence Techniques and Algorithms** Vasant, Pandian,2014-11-30 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 **Foundations of Computational Intelligence** Aboul-Ella Hassanien,Ajith Abraham,Athanasios V. Vasilakos,Witold Pedrycz,2009-05-02 Foundations of Computational Intelligence Volume 1 Learning and Approximation Theoretical Foundations and Applications Learning methods and approximation algorithms are fundamental tools that deal with computationally hard problems and problems in which the input is gradually disclosed over time Both kinds of problems have a large number of applications arising from a variety of fields such as algorithmic game theory approximation classes coloring and partitioning competitive analysis computational finance cuts and connectivity inapproximability results mechanism design network design packing and covering paradigms for design and analysis of approxi tion and online algorithms randomization techniques real world applications scheduling problems and so on The past years have witnessed a large number of interesting applications using various techniques of Computational Intelligence such as rough sets connectionist learning fuzzy logic evolutionary computing artificial immune systems swarm intelligence reinforcement learning intelligent multimedia processing etc In spite of numerous successful applications of C putational Intelligence in business and industry it is sometimes difficult to explain the performance of these techniques and algorithms from a theoretical perspective Therefore we encouraged authors to present original ideas dealing with the inc poration of different mechanisms of Computational Intelligent dealing with Lea ing and Approximation algorithms and underlying processes This edited volume comprises 15 chapters including an overview chapter which provides an up to date and state of the art research on the application of Computational Intelligence for learning and approximation **Foundations of Computational Intelligence** Ajith Abraham,Aboul-Ella Hassanien,André Ponce de Leon F. de Carvalho,Vaclav Snášel,2009-05-01 Foundations of Computational Intelligence Volume 6 Data Mining Theoretical Foundations and

Applications Finding information hidden in data is as theoretically difficult as it is practically important With the objective of discovering unknown patterns from data the methodologies of data mining were derived from statistics machine learning and artificial intelligence and are being used successfully in application areas such as bioinformatics business health care banking retail and many others Advanced representation schemes and computational intelligence techniques such as rough sets neural networks decision trees fuzzy logic evolutionary algorithms arti cial immune systems swarm intelligence reinforcement learning association rule mining Web intelligence paradigms etc have proved valuable when they are plied to Data Mining problems Computational tools or solutions based on intel gent systems are being used with great success in Data Mining applications It is also observed that strong scientific advances have been made when issues from different research areas are integrated This Volume comprises of 15 chapters including an overview chapter providing an up to date and state of the research on the applications of Computational Int ligence techniques for Data Mining The book is divided into 3 parts Part I Data Click Streams and Temporal Data Mining Part II Text and Rule Mining Part III Applications Part I on Data Click Streams and Temporal Data Mining contains four chapters that describe several approaches in Data Click Streams and Temporal Data Mining **Hybrid Computational Intelligence** Siddhartha Bhattacharyya,Václav Snášel,Indrajit Pan,Debashis De,2019-09-30 Hybrid computational intelligent techniques are efficient in dealing with the real world problems encountered in engineering fields The primary objective of this book is to provide an exhaustive introduction as well as review of the hybrid computational intelligent paradigm with supportive case studies In addition it aims to provide a gallery of engineering applications where this computing paradigm can be effectively use Finally it focuses on the recent quantum inspired hybrid intelligence to develop intelligent solutions for the future The book also incorporates video demonstrations of each application for better understanding of the subject matter *Recent Advances in Swarm Intelligence and Evolutionary Computation* Xin-She Yang,2014-12-27 This timely review volume summarizes the state of the art developments in nature inspired algorithms and applications with the emphasis on swarm intelligence and bio inspired computation Topics include the analysis and overview of swarm intelligence and evolutionary computation hybrid metaheuristic algorithms bat algorithm discrete cuckoo search firefly algorithm particle swarm optimization and harmony search as well as convergent hybridization Application case studies have focused on the dehydration of fruits and vegetables by the firefly algorithm and goal programming feature selection by the binary flower pollination algorithm job shop scheduling single row facility layout optimization training of feed forward neural networks damage and stiffness identification synthesis of cross ambiguity functions by the bat algorithm web document clustering truss analysis water distribution networks sustainable building designs and others As a timely review this book can serve as an ideal reference for graduates lecturers engineers and researchers in computer science evolutionary computing artificial intelligence machine learning computational intelligence data mining engineering optimization and designs **Foundations of Computational**

Intelligence Volume 5 Ajith Abraham,Aboul-Ella Hassanien,Vaclav Sná#el,2009-06-30 Foundations of Computational Intelligence Volume 5 Function Approximation and Classification Approximation theory is that area of analysis which is concerned with the ability to approximate functions by simpler and more easily calculated functions It is an area which like many other fields of analysis has its primary roots in the mat matics The need for function approximation and classification arises in many branches of applied mathematics computer science and data mining in particular This edited volume comprises of 14 chapters including several overview Ch ters which provides an up to date and state of the art research covering the theory and algorithms of function approximation and classification Besides research ar cles and expository papers on theory and algorithms of function approximation and classification papers on numerical experiments and real world applications were also encouraged The Volume is divided into 2 parts Part I Function Approximation and Classification Theoretical Foundations Part II Function Approximation and Classification Success Stories and Real World Applications Part I on Function Approximation and Classification Theoretical Foundations contains six chapters that describe several approaches Feature Selection the use Decomposition of Correlation Integral Some Issues on Extensions of Information and Dynamic Information System and a Probabilistic Approach to the Evaluation and Combination of Preferences Chapter 1 Feature Selection for Partial Least Square Based Dimension Red tion by Li and Zeng investigate a systematic feature reduction framework by combing dimension reduction with feature selection To evaluate the proposed framework authors used four typical data sets

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