Nelishia Pillay - Andries P. Engelbrecht Ajith Abraham - Mathys C. du Plessis Václav Snášel - Azah Kamilah Muda *Editors* 

# Advances in Nature and Biologically Inspired Computing

Proceedings of the 7th World Congress on Nature and Biologically Inspired Computing (NaBIC2015) in Pietermaritzburg, South Africa, held December 01–03, 2015



# Online Advances Nature Biologically Inspired Computing

Rituparna Chaki, Khalid Saeed, Agostino Cortesi, Nabendu Chaki

#### **Online Advances Nature Biologically Inspired Computing:**

Advances in Nature and Biologically Inspired Computing Nelishia Pillay, Andries P. Engelbrecht, Ajith Abraham, Mathys C. du Plessis, Václav Snášel, Azah Kamilah Muda, 2015-12-01 World Congress on Nature and Biologically Inspired Computing NaBIC is organized to discuss the state of the art as well as to address various issues with respect to Nurturing Intelligent Computing Towards Advancement of Machine Intelligence This Volume contains the papers presented in the Seventh World Congress NaBIC 15 held in Pietermaritzburg South Africa during December 01 03 2015 The 39 papers presented in this Volume were carefully reviewed and selected The Volume would be a valuable reference to researchers students and practitioners in the computational intelligence field **Nature-Inspired Computing Applications in Advanced** Communication Networks Gupta, Govind P., 2019-12-27 With the rapid growth of technology in society communication networks have become a heavily researched topic Implementing these advanced systems is a challenge however due to the abundance of optimization problems within these networks The use of meta heuristic algorithms and nature inspired computing has become a prevalent technique among researchers for solving these complex problems within communication networks Despite its popularity this specific computing technique lacks the appropriate amount of research that is needed for professionals to grasp a definite understanding Nature Inspired Computing Applications in Advanced Communication Networks is a collection of innovative research on the methods and applications of natural computation techniques and algorithms within communication systems such as wireless sensor networks vehicular adhoc networks and internet of things While highlighting topics including mobile sensor deployment routing optimization and sleep scheduling this book is ideally designed for researchers network professionals computer scientists mathematicians developers scholars educators and students seeking to enhance their understanding of nature inspired computing and its solutions within various advanced communication networks Bio-Inspired Computing Anu Bajaj, Sreela Sreedhar, Ajith Abraham, 2025-07-05 This book presents 51 selected papers focused on Information Retrieval and Applications from the 14th International Conference on Innovations in Bio Inspired Computing and Applications IBICA 2023 and 13th World Congress on Information and Communication Technologies WICT 2023 which was held in five different cities namely Olten Switzerland Porto Portugal Kaunas Lithuania Greater Noida India Kochi India and in online mode IBICA WICT 2023 had contributions by authors from 36 countries This book offers a valuable reference quide for all scientists academicians researchers students and practitioners focused on Information Retrieval and Applications Nature-Inspired Computing: Concepts, Methodologies, Tools, and Applications Management Association, Information Resources, 2016-07-26 As technology continues to become more sophisticated mimicking natural processes and phenomena also becomes more of a reality Continued research in the field of natural computing enables an understanding of the world around us in addition to opportunities for man made computing to mirror the natural processes and systems that have existed for centuries Nature Inspired Computing Concepts

Methodologies Tools and Applications takes an interdisciplinary approach to the topic of natural computing including emerging technologies being developed for the purpose of simulating natural phenomena applications across industries and the future outlook of biologically and nature inspired technologies Emphasizing critical research in a comprehensive multi volume set this publication is designed for use by IT professionals researchers and graduate students studying intelligent Bio-Inspired and Nanoscale Integrated Computing Mary Mehrnoosh Eshaghian-Wilner, 2009-09-22 Brings the latest advances in nanotechnology and biology to computing This pioneering book demonstrates how nanotechnology can create even faster denser computing architectures and algorithms Furthermore it draws from the latest advances in biology with a focus on bio inspired computing at the nanoscale bringing to light several new and innovative applications such as nanoscale implantable biomedical devices and neural networks Bio Inspired and Nanoscale Integrated Computing features an expert team of interdisciplinary authors who offer readers the benefit of their own breakthroughs in integrated computing as well as a thorough investigation and analyses of the literature Carefully edited the book begins with an introductory chapter providing a general overview of the field It ends with a chapter setting forth the common themes that tie the chapters together as well as a forecast of emerging avenues of research Among the important topics addressed in the book are modeling of nano devices quantum computing quantum dot cellular automata dielectrophoretic reconfigurable nano architectures multilevel and three dimensional nanomagnetic recording spin wave architectures and algorithms fault tolerant nanocomputing molecular computing self assembly of supramolecular nanostructures DNA nanotechnology and computing nanoscale DNA sequence matching medical nanorobotics heterogeneous nanostructures for biomedical diagnostics biomimetic cortical nanocircuits bio applications of carbon nanotubes and nanoscale image processing Readers in electrical engineering computer science and computational biology will gain new insights into how bio inspired and nanoscale devices can be used to design the next generation of enhanced integrated circuits Advances in Internet, Data & Web Technologies Leonard Barolli, Fatos Xhafa, Nadeem Javaid, Evjola Spaho, Vladi Kolici, 2018-02-23 This book presents original contributions on the theories and practices of emerging Internet data and Web technologies and their applicability in businesses engineering and academia focusing on advances in the life cycle exploitation of data generated from the digital ecosystem data technologies that create value e g for businesses toward a collective intelligence approach The Internet has become the most proliferative platform for emerging large scale computing paradigms Among these data and web technologies are two of the most prominent paradigms and are found in a variety of forms such as data centers cloud computing mobile cloud and mobile Web services These technologies together create a digital ecosystem whose cornerstone is the data cycle from capturing to processing analyzing and visualizing The investigation of various research and development issues in this digital ecosystem are made more pressing by the ever increasing requirements of real world applications that are based on storing and processing large amounts of data. The book is a valuable resource for researchers

software developers practitioners and students interested in the field of data and web technologies Advances in Internet, Data and Web Technologies Leonard Barolli, Juggapong Natwichai, Tomoya Enokido, 2021-02-18 This book presents original contributions to the theories and practices of emerging Internet data and web technologies and their applicability in businesses engineering and academia The Internet has become the most proliferative platform for emerging large scale computing paradigms Among these data and web technologies are two most prominent paradigms in a variety of forms such as data centers cloud computing mobile cloud mobile web services and so on These technologies altogether create a digital ecosystem whose cornerstone is the data cycle from capturing to processing analysis and visualization The investigation of various research and development issues in this digital ecosystem is boosted by the ever increasing needs of real life applications which are based on storing and processing large amounts of data As a key feature this book addresses advances in the life cycle exploitation of data generated from the digital ecosystem data technologies that create value for the knowledge and businesses toward a collective intelligence approach Researchers software developers practitioners and students interested in the field of data and web technologies will find this book useful and a reference for their activity

Advanced Computing and Systems for Security Rituparna Chaki, Khalid Saeed, Agostino Cortesi, Nabendu Chaki, 2017-03-09 This book presents extended versions of papers originally presented and discussed at the 3rd International Doctoral Symposium on Applied Computation and Security Systems ACSS 2016 held from August 12 to 14 2016 in Kolkata India The symposium was jointly organized by the AGH University of Science Ca Foscari University Venice Italy and the University of Calcutta India The book is divided into two volumes Volumes 3 and 4 and presents dissertation works in the areas of Image Processing Biometrics based Authentication Soft Computing Data Mining Next Generation Networking and Network Security Remote Healthcare Communications Embedded Systems Software Engineering and Service Engineering The first two volumes of the book published the works presented at the ACSS 2015 which was held from May 23 to 25 2015 Biotechnology: Concepts, Methodologies, Tools, and Applications Management Association, Information in Kolkata India Resources, 2019-06-07 Biotechnology can be defined as the manipulation of biological process systems and organisms in the production of various products With applications in a number of fields such as biomedical chemical mechanical and civil engineering research on the development of biologically inspired materials is essential to further advancement Biotechnology Concepts Methodologies Tools and Applications is a vital reference source for the latest research findings on the application of biotechnology in medicine engineering agriculture food production and other areas It also examines the economic impacts of biotechnology use Highlighting a range of topics such as pharmacogenomics biomedical engineering and bioinformatics this multi volume book is ideally designed for engineers pharmacists medical professionals practitioners academicians and researchers interested in the applications of biotechnology 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 **Soft Computing Applications** Kanad Ray, Millie Pant, Anirban Bandyopadhyay, 2018-03-29 This book optimization provides a reference guide for researchers scientists and industrialists working in the area of soft computing and highlights the latest advances in and applications of soft computing techniques in multidisciplinary areas Gathering papers presented at the International Conference on Soft Computing Theories and Applications SoCTA 2016 which was held in Jaipur Rajasthan India on December 28 30 2016 it focuses on applying soft computing to solve real life problems arising in various domains from medical and healthcare to supply chain management image processing and cryptanalysis. The term soft computing represents an umbrella term for computational techniques like fuzzy logic neural networks and nature inspired algorithms In the past few decades there has been an exponential rise in the application of soft computing techniques to address complex and intricate problems in diverse spheres of life The versatility of these techniques has made them a favourite among Recent Advances in Swarm Intelligence and Evolutionary Computation Xin-She scientists and researchers alike 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 Hybrid Advanced Optimization Methods with Evolutionary Computation Techniques in Energy Forecasting Wei-Chiang Hong, 2018-10-19 This book is a printed edition of the Special Issue Hybrid Advanced Optimization Methods with Evolutionary Computation Techniques in Energy Forecasting that was published in Energies Decision Making Through Bio-Inspired Optimization Jaganathan, Ramkumar, Mehta, Shilpa, Krishan, Ram, 2024-04-15 Academic scholars entrenched in the complexities of various domains face the daunting task of navigating intricate decision making scenarios The prevailing need for efficient and effective decision making tools becomes increasingly apparent as traditional methodologies struggle to keep pace with the demands of modern research and industry This pivotal issue necessitates a shift urging scholars to explore unconventional approaches that can transcend disciplinary boundaries and unlock new dimensions of problem solving In response to these pressing challenges Intelligent Decision Making Through Bio Inspired Optimization emerges as a beacon of ingenuity This groundbreaking book transcends usual disciplinary boundaries seamlessly integrating computer science artificial intelligence optimization and decision science Its multidisciplinary approach addresses the inherent complexities faced by scholars offering a comprehensive exploration of nature inspired algorithms such as genetic algorithms swarm intelligence and evolutionary strategies The book s core mission is to empower academic scholars with the tools to overcome contemporary decision making hurdles providing a holistic understanding of these bio inspired approaches and their potential to revolutionize the scholarly landscape Self-Organizing Migrating Algorithm Donald Davendra, Ivan Zelinka, 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 prev 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 Advances in Digital Technologies J. Mizera-Pietraszko, S. Fong, 2015-05-20 Easy access to digital information in every form is something which has become indispensable given our ever increasing reliance on digital technology But such access would not be possible without the reliable and effective infrastructure which has led to the large scale development of web technologies This book presents the 27 papers delivered at the 6th International Conference on Applications of Digital Information and Web Technologies ICADIWT held in February 2015 at the University of Macau Macau The book is divided into seven sections Internet communication human computer interaction adaptive web applications data communication cloud computing systems engineering and data mining Since each paper is a survey contributed by different experts from very many countries this book can be seen as a collection of the current research trends in the field and hence it will be of interest to all those whose work involves digital information and web technology **Advanced Research on** Cloud Computing Design and Applications Aljawarneh, Shadi, 2015-09-23 Modern society requires a specialized persistent approach to IT service delivery Cloud computing offers the most logical answer through a highly dynamic and virtualized resource made available by an increasing number of service providers Advanced Research on Cloud Computing Design and Applications shares the latest high quality research results on cloud computing and explores the broad applicability and scope of these trends on an international scale venturing into the hot button issue of IT services evolution and what we need to do to be prepared for future developments in cloud computing This book is an essential reference source for researchers and practitioners in the field of cloud computing as well as a guide for students academics or anyone seeking to learn more about advancement in IT services This publication features chapters covering a broad range of relevant topics including cloud computing for e government cloud computing in the public sector security in the cloud hybrid clouds and outsourced data IT service personalization and supply chain in the cloud **Differential Evolution In** Chemical Engineering: Developments And Applications Gade Pandu Rangaiah, Shivom Sharma, 2017-05-29 Optimization plays a key role in the design planning and operation of chemical and related processes for several decades Techniques for solving optimization problems are of deterministic or stochastic type Of these stochastic techniques can solve any type of optimization problems and can be adapted for multiple objectives Differential evolution DE proposed about two decades ago is one of the stochastic techniques Its algorithm is simple to understand and use DE has found many applications in chemical engineering This unique compendium focuses on DE its recent developments and applications in chemical engineering It will cover both single and multi objective optimization. The book contains a number of chapters from experienced editors and also several chapters from active researchers in this area Modeling Complex Processes Through Nature-Analogous Methods Christina Klüver, Jürgen Klüver, Jörn Schmidt, 2025-04-29 This book is an introduction to nature analogous techniques and related formal methods For each technique application examples are provided It covers cellular automata and Boolean networks evolutionary algorithms as well as simulated annealing fuzzy methods neural networks and finally hybrid systems i e combinations of various techniques Based on the theory of complex dynamic systems theoretical foundations are also presented and the similarities of these seemingly very heterogeneous techniques are pointed out The edition has been revised and expanded with current trends such as ChatGPT **Proceedings of the 15th International Conference on Soft Computing and Pattern Recognition (SoCPaR 2023)** Anu Bajaj, Ajith Abraham, Pooja Manghirmalani Mishra, Kun Ma,2025-05-03 This book presents 52 selected papers focused on Information Retrieval and Applications from the 14th International Conference on Soft Computing and Pattern Recognition SoCPaR 2023 and 14th World Congress on Nature and Biologically Inspired Computing NaBIC 2023 SoCPaR NaBIC 2023 was held in 5 different cities namely Olten Switzerland Porto Portugal Kaunas Lithuania Greater Noida India Kochi India and in online mode The conference had contributions by

authors from 39 countries This Volume offers a valuable reference guide for all scientists academicians researchers students
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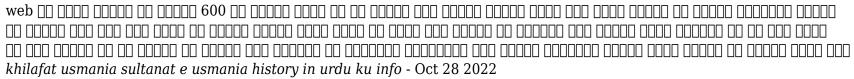
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