

Evolutionary Computation For Dynamic Optimization Problems By Shengxiang Yang

Presents current developments in the field of evolutionary scheduling and demonstrates the applicability of evolutionary computational techniques to solving scheduling problems This book provides insight into the use of evolutionary computations (EC) in real-world scheduling, showing readers how to choose a specific evolutionary computation and how to validate the results using metrics and statistics. It offers a spectrum of real-world optimization problems, including applications of EC in industry and service organizations such as healthcare scheduling, aircraft industry, school timetabling, manufacturing systems, and transportation scheduling in the supply chain. It also features problems with different degrees of complexity, practical requirements, user constraints, and MOEC solution approaches. Evolutionary Computation in Scheduling starts with a chapter on scientometric analysis to analyze scientific literature in evolutionary computation in scheduling. It then examines the role and impacts of ant colony optimization (ACO) in job shop scheduling problems, before presenting the application of the ACO algorithm in healthcare scheduling. Other chapters explore task scheduling in heterogeneous computing systems and truck scheduling using swarm intelligence, application of sub-population scheduling algorithm in multi-population evolutionary dynamic optimization, task scheduling in cloud environments, scheduling of robotic disassembly in remanufacturing using the bees algorithm, and more. This book: Provides a representative sampling of real-world problems currently being tackled by practitioners Examines a variety of single-, multi-, and many-objective problems that have been solved using evolutionary computations, including evolutionary algorithms and swarm intelligence Consists of four main parts: Introduction to Scheduling Problems, Computational Issues in Scheduling Problems, Evolutionary Computation, and Evolutionary Computations for Scheduling Problems Evolutionary Computation in Scheduling is ideal for engineers in industries, research scholars, advanced undergraduates and graduate students, and faculty teaching and conducting research in Operations Research and Industrial Engineering.

Biological and other natural processes have always been a source of inspiration for computer science and information technology. Many emerging problem solving techniques integrate advanced evolution and cooperation strategies, encompassing a range of spatio-temporal scales for visionary conceptualization of evolutionary computation. This book is a collection of research works presented in the VI International Workshop on Nature Inspired Cooperative Strategies for Optimization (NICSO) held in Canterbury, UK. Previous editions of NICSO were held in Granada, Spain (2006 & 2010), Acireale, Italy (2007), Tenerife, Spain (2008), and Cluj-Napoca, Romania (2011). NICSO 2013 and this book provides a place where state-of-the-art research, latest ideas and emerging areas of nature inspired cooperative strategies for problem solving are vigorously discussed and exchanged among the scientific community. The breadth and variety of articles in this book report on nature inspired methods and applications such as Swarm Intelligence, Hyper-heuristics, Evolutionary Algorithms, Cellular Automata, Artificial Bee Colony, Dynamic Optimization, Support Vector Machines, Multi-Agent Systems, Ant Clustering, Evolutionary Design Optimisation, Game Theory and other several Cooperation Models.

This book provides a collection of forty articles containing new material on both theoretical aspects of Evolutionary Computing (EC), and demonstrating the usefulness/success of it for various kinds of large-scale real world problems. Around 23 articles deal with various theoretical aspects of EC and 17 articles demonstrate the success of EC methodologies. These articles are written by leading experts of the field from different countries all over the world.

This book addresses the frontier advances in the theory and application of nature-inspired optimization techniques, including solving the quadratic assignment problem, prediction in nature-inspired dynamic optimization, the lion algorithm and its applications, optimizing the operation scheduling of microgrids, PID controllers for two-legged robots, optimizing crane operating times, planning electrical energy distribution systems, automatic design and evaluation of classification pipelines, and optimizing wind-energy power generation plants. The book also presents a variety of nature-inspired methods and illustrates methods of adapting these to said applications. Nature-inspired computation, developed by mimicking natural phenomena, makes a significant contribution toward the solution of non-convex optimization problems that normal mathematical optimizers fail to solve. As such, a wide range of nature-inspired computing approaches has been used in multidisciplinary engineering applications. Written by researchers and developers from a variety of fields, this book presents the latest findings, novel techniques and pioneering applications.

Evolutionary Optimization in Dynamic Environments

10th International Conference Dortmund, Germany, September 13-17, 2008 Proceedings

Evolutionary Computation in Combinatorial Optimization

Evolutionary Design and Manufacture

EvoWorkshops 2004: EvoBIO, EvoCOMNET, EvoHOT, EvoIASP, EvoMUSART, and EvoSTOC, Coimbra, Portugal, April 5-7, 2004, Proceedings

Proceeding of the 2nd International Conference on Artificial Intelligence and Its Applications (2021)

This book is an updated effort in summarizing the trending topics and new hot research lines in solving dynamic problems using metaheuristics. An analysis of the present state in solving complex problems quickly draws a clear picture: problems that change in time, having noise and uncertainties in their definition are becoming very important. The tools to face these problems are still to be built, since existing techniques are either slow or inefficient in tracking the many global optima that those problems are presenting to the solver technique. Thus, this book is devoted to include several of the most important advances in solving dynamic problems. Metaheuristics are the more popular tools to this end, and then we can find in the book how to best use genetic algorithms, particle swarm, ant colonies, immune systems, variable neighborhood search, and many other bioinspired techniques. Also, neural network solutions are considered in this book. Both, theory and practice have been addressed in the chapters of the book. Mathematical background and methodological tools in solving this new class of problems and applications are included. From the applications point of view, not just academic benchmarks are dealt with, but also real world applications in logistics and bioinformatics are discussed here. The book then covers theory and practice, as well as discrete versus continuous dynamic optimization, in the aim of creating a fresh and comprehensive volume. This book is targeted to either beginners and experienced practitioners in dynamic optimization, since we took care of devising the chapters in a way that a wide audience could profit from its contents. We hope to offer a single source for up-to-date information in dynamic optimization, an inspiring and attractive new research domain that appeared in these last years and is here to stay.

This book is devoted to the leading research in applying learning automaton (LA) and heuristics for solving benchmark and real-world optimization problems. The ever-increasing application of the LA as a promising reinforcement learning technique in artificial intelligence makes it necessary to provide scholars, scientists, and engineers with a practical discussion on LA solutions for optimization. The book starts with a brief introduction to LA models for optimization. Afterward, the research areas related to LA and optimization are addressed as bibliometric network analysis. Then, LA's application in behavior control in evolutionary computation, and memetic models of object migration automata and cellular learning automata for solving NP hard problems are considered. Next, an overview of multi-population methods for DOPs, LA's application in dynamic optimization problems (DOPs), and the function evaluation management in evolutionary multi-population for DOPs are discussed. Highlighted benefits

- Presents the latest advances in learning automata-based optimization approaches.
- Addresses the memetic models of learning automata for solving NP-hard problems.
- Discusses the application of learning automata for behavior control in evolutionary computation in detail.
- Gives the fundamental principles and analyses of the different concepts associated with multi-population methods for dynamic optimization problems.

This volume constitutes the proceedings of the 7th International Conference on Simulated Evolution and Learning, SEAL 2008, held in Melbourne, Australia, during December 7-10, 2008. The 65 papers presented were carefully reviewed and selected from 140 submissions. The topics covered are evolutionary learning; evolutionary optimisation; hybrid learning; adaptive systems; theoretical issues in evolutionary computation; and real-world applications of evolutionary computation techniques.

This book constitutes the refereed conference proceedings of the 21st International Conference on the Applications of Evolutionary Computation, EvoApplications 2018, held in Parma, Italy, in April 2018, collocated with the Evo* 2018 events EuroGP, EvoCOP, and EvoMUSART. The 59 revised full papers presented were carefully reviewed and selected from 84 submissions. EvoApplications 2018 combined research from 14 different domains: business analytics and finance (EvoBAFIN); computational biology (EvoBIO); communication networks and other parallel and distributed systems (EvoCOMNET); complex systems (EvoCOMPLEX); energy-related optimization (EvoENERGY); games and multi-agent systems (EvoGAMES); image analysis, signal processing and pattern recognition (EvoIASP); realworld industrial and commercial environments (EvoINDUSTRY); knowledge incorporation in evolutionary computation (EvoKNOW); continuous parameter optimization (EvoNUM); parallel architectures and distributed infrastructures (EvoPAR); evolutionary robotics (EvoROBOT); nature-inspired algorithms in software engineering and testing (EvoSET); and stochastic and dynamic environments (EvoSTOC).

ECAI 2020

Designing Evolutionary Algorithms for Dynamic Environments

Optimization Techniques for Solving Complex Problems

A Survey

EvoApplications 2010: EvoCOMPLEX, EvoGAMES, EvoIASP, EvoINTELLIGENCE, EvoNUM, and EvoSTOC, Istanbul, Turkey, April 7-9, 2010, Proceedings

13th European Conference, EvoCOP 2013, Vienna, Austria, April 3-5, 2013, Proceedings

This book constitutes the refereed joint proceedings of eleven European workshops on the Theory and Applications of Evolutionary Computation, EvoWorkshops 2009, held in Tübingen, Germany, in April 2009 within the scope of the EvoStar 2009 event. The 68 revised full papers and 23 revised short papers presented were carefully reviewed and selected from a total of 143 submissions. With respect to the eleven workshops covered, the papers are organized in topical sections on telecommunication networks and other parallel and distributed systems, environmental issues, finance and economics, games, design automation, image analysis and signal processing, interactive evolution and humanized computational intelligence, music, sound, art and design, continuous parameter optimisation, stochastic and dynamic environments, as well as transportation and logistics.

This book constitutes the refereed proceedings of the 10th International Conference on Parallel Problem Solving from Nature, PPSN 2008, held in Dortmund, Germany, in September 2008. The 114 revised full papers presented were carefully reviewed and selected from 206 submissions. The conference covers a wide range of topics, such as evolutionary computation, quantum computation, molecular computation, neural computation, artificial life, swarm intelligence, artificial ant systems, artificial immune systems, self-organizing systems, emergent behaviors, and applications to real-world problems. The paper are organized in topical sections on formal theory, new techniques, experimental analysis, multiobjective optimization, hybrid methods, and applications.

The two volumes LNCS 9597 and 9598 constitute the refereed conference proceedings of the 19th European Conference on the Applications of Evolutionary Computation, EvoApplications 2016, held in Porto, Portugal, in March/April 2016, co-located with the Evo* 2016 events EuroGP, EvoCOP, and EvoMUSART. The 57 revised full papers presented together with 17 poster papers were carefully reviewed and selected from 115 submissions. EvoApplications 2016 consisted of the following 13 tracks: EvoBAFIN (natural computing methods in business analytics and finance), EvoBIO (evolutionary computation, machine learning and data mining in computational biology), EvoCOMNET (nature-inspired techniques for telecommunication networks and other parallel and distributed systems), EvoCOMPLEX (evolutionary algorithms and complex systems), EvoENERGY (evolutionary computation in energy applications), EvoGAMES (bio-inspired algorithms in games), EvoIASP (evolutionary computation in image analysis, signal processing, and pattern recognition), EvoINDUSTRY (nature-inspired techniques in industrial settings), EvoNUM (bio-inspired algorithms for continuous parameter optimization), EvoPAR (parallel implementation of evolutionary algorithms), EvoRISK (computational intelligence for risk management, security and defence applications), EvoROBOT (evolutionary robotics), and EvoSTOC (evolutionary algorithms in stochastic and dynamic environments).

This book explores the use of Evolutionary Algorithms (EAs) in dynamic optimization problems. Evolutionary Algorithms are powerful tools for optimization problems. Nevertheless, when the problem is dynamic, the EA can face difficulties due to the convergence of the population on a specific region of the search space. Different improvements have been made to the standard EA to make it more robust in dynamic problems: the increase of diversity, the incorporation of memory or the inclusion of anticipation methods. In this book we introduce important and novel contributions to address some of the drawbacks of current approaches. First, the book describes different approaches to make memory more useful and effective, including a new algorithm that evolves the best memory size according to the moment and characteristics of the dynamic problem. Second, the book analyses the importance of the population's diversity in EAs for dynamic optimization problems, by using two different biologically inspired genetic operators. Third, different prediction techniques that allow the EA to forecast both the time of the next change and the direction of this change are introduced.

Evolutionary Algorithms for Dynamic Optimization Problems

Evolutionary Algorithms and Dynamic Optimization Problems

Metaheuristics for Dynamic Optimization

10th International Conference, SEAL 2014, Dunedin, New Zealand, December 15-18, Proceedings

Advances in Evolutionary Computing

Evolutionary Multi-Criterion Optimization

The fourth evolutionary/adaptive computing conference at the University of Plymouth again explores the utility of various evolutionary/adaptive search algorithms and complementary computational intelligence techniques within design and manufacturing. The content of the following chapters represents a selection of the diverse set of papers presented at the conference that relate to both engineering design and also to more general design areas. This expansion has been the result of a conscious effort to recognise generic problem areas and complementary research across a wide range of design and manufacture activity. There has been a major increase in both research into and utilisation of evolutionary and adaptive systems within the last two years. This is reflected in the establishment of major annual joint US genetic and evolutionary computing conferences and the introduction of a large number of events relating to the application of these technologies in specific fields. The Plymouth conference remains a long-standing, event both as ACDM and as the earlier ACEDC series. The conference maintains its policy of single stream presentation and associated poster and demonstrator sessions. The event retains the support of several UK Engineering Institutions and is now recognised by the International Society for Genetic and Evolutionary Computation as a mainstream event. It continues to attract an international audience of leading researchers and practitioners in the field.

Evolutionary computation techniques have attracted increasing attention in recent years for solving complex optimization problems. They are more robust than traditional methods based on formal logics or mathematical programming for many real world OR/MS problems. Evolutionary computation techniques can deal with complex optimization problems better than traditional optimization techniques. However, most papers on the application of evolutionary computation techniques to Operations Research /Management Science (OR/MS) problems have scattered around in different journals and conference proceedings. They also tend to focus on a very special and narrow topic. It is the right time that an archival book series publishes a special volume which - cludes critical reviews of the state-of-art of those evolutionary computation techniques which have been found particularly useful for OR/MS problems, and a collection of papers which represent the latest development in tackling various OR/MS problems by evolutionary computation techniques. This special volume of the book series on Evolutionary Computation aims at filling in this gap in the current literature. The special volume consists of invited papers written by leading researchers in the field. All papers were peer reviewed by at least two recognised reviewers. The book covers the foundation as well as the practical side of evolutionary optimization.

This book provides a compilation on the state-of-the-art and recent advances of evolutionary computation for dynamic optimization problems. The motivation for this book arises from the fact that many real-world optimization problems and engineering systems are subject to dynamic environments, where changes occur over time. Key issues for addressing dynamic optimization problems in evolutionary computation, including fundamentals, algorithm design, theoretical analysis, and real-world applications, are presented. "Evolutionary Computation for Dynamic Optimization Problems" is a valuable reference to scientists, researchers, professionals and students in the field of engineering and science, particularly in the areas of computational intelligence, nature- and bio-inspired computing, and evolutionary computation.

The year 2009 celebrates the bicentenary of Darwin's birth and the 150th anniversary of the publication of his seminal work, On the Origin of Species.If this makes 2009 a special year for the research community working in biology and evolution, the field of evolutionary computation (EC) also shares the same excitement. EC techniques are efficient, nature-inspired planning and optimization methods based on the principles of natural evolution and genetics. Due to their efficiency and simple underlying principles, these methods can be used in the context of problem solving, optimization, and machine learning. A large and ever-increasing number of researchers and professionals make use of EC techniques in various application domains. This volume represents a careful selection of relevant EC applications combined with a thorough examination of the techniques used in EC. The papers in the volume illustrate the current state of the art in the application of EC and can help and inspire researchers and professionals to develop efficient EC methods for design and problem solving.

Applications of Evolutionary Computation

Learning, Optimization and Interdisciplinary Applications

Frontier Applications of Nature Inspired Computation

Evolutionary Computation for Dynamic Optimization Problems

First International Conference on Swarm, Evolutionary, and Memetic Computing, SEMCCO 2010, Chennai, India, December 16-18, 2010, Proceedings

Applications of Metaheuristics in Process Engineering

This LNCS volume contains the papers presented at the First Swarm, Evolutionary and Memetic Computing Conference (SEMCCO 2010) held during December 16— 18, 2010 at SRM University, Chennai, in India. SEMCCO 2010 marked the beginning of a prestigious international conference series that aims at bringing together researchers from academia and industry to report and review the latest progress in the cutting-edge research on swarm, evolutionary, and memetic computing, to explore new application areas, to design new bio-inspired algorithms for solving specific hard optimization problems, and finally to create awareness on these domains to a wider audience of practitioners. SEMCCO 2010 received 225 paper submissions from 20 countries across the globe. After a rigorous peer-review process involving 610 reviews in total, 90 full-length articles were accepted for oral presentation at the conference. This corresponds to an acceptance rate of 40% and is intended for maintaining the high standards of the conference proceedings. The papers included in this LNCS volume cover a wide range of topics in swarm, evolutionary, and memetic computing algorithms and their real-world applications in problems selected from diverse domains of science and engineering.

This book compiles recent advances of evolutionary algorithms in dynamic and uncertain environments within a unified framework. The book is motivated by the fact that some degree of uncertainty is inevitable in characterizing any realistic engineering systems. Discussion includes representative methods for addressing major sources of uncertainties in evolutionary computation, including handle of noisy fitness functions, use of approximate fitness functions, search for robust solutions, and tracking moving optimums.

This book constitutes the refereed proceedings of the 13th European Conference on Evolutionary Computation in Combinatorial Optimization, EvoCOP 2013, held in Vienna, Austria, in April 2013, collocated with the Evo* 2013 events EuroGP, EvoBIO, EvoMUSART, and EvoApplications. The 23 revised full papers presented were carefully reviewed and selected from 50 submissions. The papers present the latest research and discuss current developments and applications in metaheuristics - a paradigm to effectively solve difficult combinatorial optimization problems appearing in various industrial, economic, and scientific domains. Prominent examples of metaheuristics are ant colony optimization, evolutionary algorithms, greedy randomized adaptive search procedures, iterated local search, simulated annealing, tabu search, and variable neighborhood search. Applications include scheduling, timetabling, network design, transportation and distribution, vehicle routing, the travelling salesman problem, packing and cutting, satisfiability, and general mixed integer programming.

This book constitutes the refereed proceedings of the Third International Workshop on Ant Algorithms, ANTS 2002, held in Brussels, Belgium in September 2002. The 17 revised full papers, 11 short papers, and extended poster abstracts presented were carefully reviewed and selected from 52 submissions. The papers deal with theoretical and foundational aspects and a variety of new variants of ant algorithms as well as with a broad variety of optimization applications in networking and operations research. All in all, this book presents the state of the art in research and development in the emerging field of ant algorithms

Fuzzy Logic Hybrid Extensions of Neural and Optimization Algorithms: Theory and Applications

Applications of Evolutionary Computing

Adapting Evolutionary Approaches for Optimization in Dynamic Environments

Theory and Applications

Advances in Learning Automata and Intelligent Optimization

Selected Papers from ACDM '00

Real-world problems and modern optimization techniques to solve them Here, a team of international experts brings together core ideas for solving complex problems in optimization across a wide variety of real-world settings, including computer science, engineering, transportation, telecommunications, and bioinformatics. Part One—covers methodologies for complex problem solving including genetic programming, neural networks, genetic algorithms, hybrid evolutionary algorithms, and more. Part Two—delves into applications including DNA sequencing and reconstruction, location of antennae in telecommunication networks, metaheuristics, FPGAs, problems arising in telecommunication networks, image processing, time series prediction, and more. All chapters contain examples that illustrate the applications themselves as well as the actual performance of the algorithms. Optimization Techniques for Solving Complex Problems is a valuable resource for practitioners and researchers who work with optimization in real-world settings.

Metaheuristics exhibit desirable properties like simplicity, easy parallelizability and ready applicability to different types of optimization problems such as real parameter optimization, combinatorial optimization and mixed integer optimization. They are thus beginning

to play a key role in different industrially important process engineering applications, among them the synthesis of heat and mass exchange equipment, synthesis of distillation columns and static and dynamic optimization of chemical and bioreactors. This book explains cutting-edge research techniques in related computational intelligence domains and their applications in real-world process engineering. It will be of interest to industrial practitioners and research academics.

Nature-inspired algorithms have a great popularity in the current scientific community, being the focused scope of many research contributions in the literature year by year. The rationale behind the acquired momentum by this broad family of methods lies on their outstanding performance evinced in hundreds of research fields and problem instances. This book gravitates on the development of nature-inspired methods and their application to stochastic, dynamic and robust optimization. Topics covered by this book include the design and development of evolutionary algorithms, bio-inspired metaheuristics, or memetic methods, with empirical, innovative findings when used in different subfields of mathematical optimization, such as stochastic, dynamic, multimodal and robust optimization, as well as noisy optimization and dynamic and constraint satisfaction problems.

Details robustness, stability, and performance of Evolutionary Algorithms in dynamic environments

Evolutionary Computation in Dynamic and Uncertain Environments

19th European Conference, EvoApplications 2016, Porto, Portugal, March 30 -- April 1, 2016, Proceedings, Part II

Nature Inspired Cooperative Strategies for Optimization (NICSO 2013)

Parallel Problem Solving from Nature - PPSN X

21st International Conference, EvoApplications 2018, Parma, Italy, April 4-6, 2018, Proceedings

Evolutionary Algorithms in Dynamic Optimization Problems

This book presents the proceedings of the 24th European Conference on Artificial Intelligence (ECAI 2020), held in Santiago de Compostela, Spain, from 29 August to 8 September 2020. The conference was postponed from June, and much of it conducted online due to the COVID-19 restrictions. The conference is one of the principal occasions for researchers and practitioners of AI to meet and discuss the latest trends and challenges in all fields of AI and to demonstrate innovative applications and uses of advanced AI technology. The book also includes the proceedings of the 10th Conference on Prestigious Applications of Artificial Intelligence (PAIS 2020) held at the same time. A record number of more than 1,700 submissions was received for ECAI 2020, of which 1,443 were reviewed. Of these, 361 full-papers and 36 highlight papers were accepted (an acceptance rate of 25% for full-papers and 45% for highlight papers). The book is divided into three sections: ECAI full papers; ECAI highlight papers; and PAIS papers. The topics of these papers cover all aspects of AI, including Agent-based and Multi-agent Systems; Computational Intelligence; Constraints and Satisfiability; Games and Virtual Environments; Heuristic Search; Human Aspects in AI; Information Retrieval and Filtering; Knowledge Representation and Reasoning; Machine Learning; Multidisciplinary Topics and Applications; Natural Language Processing; Planning and Scheduling; Robotics; Safe, Explainable, and Trustworthy AI; Semantic Technologies; Uncertainty in AI; and Vision. The book will be of interest to all those whose work involves the use of AI technology.

A clear and lucid bottom-up approach to the basic principles of evolutionary algorithms Evolutionary algorithms (EAs) are a type of artificial intelligence. EAs are motivated by optimization processes that we observe in nature, such as natural selection, species migration, bird swarms, human culture, and ant colonies. This book discusses the theory, history, mathematics, and programming of evolutionary optimization algorithms.

Featured algorithms include genetic algorithms, genetic programming, ant colony optimization, particle swarm optimization, differential evolution, biogeography-based optimization, and many others. Evolutionary Optimization Algorithms: Provides a straightforward, bottom-up approach that assists the reader in obtaining a clear-but theoretically rigorous understanding of evolutionary algorithms, with an emphasis on implementation Gives a careful treatment of recently developed EAs-including opposition-based learning, artificial fish swarms, bacterial foraging, and many others- and discusses their similarities and differences from more well-established EAs Includes chapter-end problems plus a solutions manual available online for instructors Offers simple examples that provide the reader with an intuitive understanding of the theory Features source code for the examples available on the author's website Provides advanced mathematical techniques for analyzing EAs, including Markov modeling and dynamic system modeling Evolutionary Optimization Algorithms: Biologically Inspired and Population-Based Approaches to Computer Intelligence is an ideal text for advanced undergraduate students, graduate students, and professionals involved in engineering and computer science.

This volume constitutes the proceedings of the 10th International Conference on Simulated Evolution and Learning, SEAL 2012, held in Dunedin, New Zealand, in December 2012. The 42 full papers and 29 short papers presented were carefully reviewed and selected from 109 submissions. The papers are organized in topical sections on evolutionary optimization; evolutionary multi-objective optimization; evolutionary machine learning; theoretical developments; evolutionary feature reduction; evolutionary scheduling and combinatorial optimization; real world applications and evolutionary image analysis.

Evolutionary Computation (EC) techniques are efficient, nature-inspired methods based on the principles of natural evolution and genetics. Due to their efficiency and simple underlying principles, these methods can be used for a diverse range of activities including problem solving, optimization, machine learning and pattern recognition. A large and continuously increasing number of researchers and professionals make use of EC techniques in various application domains. This volume presents a careful selection of relevant EC examples combined with a thorough examination of the techniques used in EC. The papers in the volume illustrate the current state of the art in the application of EC and should help and inspire researchers and professionals to develop efficient EC methods for design and problem solving. All papers in this book were presented during EvoApplications 2010, which included a range of events on application-oriented aspects of EC. Since 1998, EvoApplications - formerly known as EvoWorkshops - has provided a unique opportunity for EC researchers to meet and discuss application aspects of EC and has been an important link between EC research and its application in a variety of domains. During these 12 years, new events have arisen, some have disappeared, while others have matured to become conferences of their own, such as EuroGP in 2000, EvoCOP in 2004, and EvoBIO in 2007. And from this year, EvoApplications has become a conference as well.

Ant Algorithms

4th International Conference, EMO 2007, Matsushima, Japan, March 5-8, 2007, Proceedings

EvoWorkshops 2009: EvoCOMNET, EvoENVIRONMENT, EvoFIN, EvoGAMES, EvoHOT, EvoIASP, EvoINTERACTION, EvoMUSART, EvoNUM, EvoSTOC, EvoTRANSLOG, Tübingen, Germany, April 15-17, 2009, Proceedings

Evolutionary Optimization

24th European Conference on Artificial Intelligence, 29 August-8 September 2020, Santiago de Compostela, Spain - Including 10th Conference on Prestigious Applications of Artificial Intelligence (PAIS 2020)

Evolutionary Algorithms (EAs) have grown into a mature field of research in optimization, and have proven to be effective and robust problem solvers for a broad range of static real-world optimization problems. Yet, since they are based on the principles of natural evolution, and dynamic process in a changing environment, EAs are also well suited to dynamic optimization problems. Evolutionary Optimization in Dynamic Environments is the first comprehensive work on the application of EAs to dynamic optimization problems. It provides an extensive survey and shows how EAs can be successfully used to continuously and efficiently adapt a solution to a changing environment, find a good trade-off between solution quality and adaptation cost, find robust solutions whose quality is insensitive to changes in the environment, find flexible solutions that can be easily adapted when necessary. All four aspects are treated in this book, providing a holistic view on the challenges and opportunities when applying EAs to dynamic optimization problems. The comprehensive and up-to-date coverage of the subject, together with the research, makes Evolutionary Optimization in Dynamic Environments an invaluable resource for researchers and professionals who are dealing with dynamic and stochastic optimization problems, and who are interested in applying local search heuristics, such as evolutionary algorithms. This book constitutes the refereed proceedings of the 4th International Conference on Evolutionary Multi-Criterion Optimization, EMO 2007, held in Matsushima, Japan in March 2007. The 65 revised full papers presented together with 4 invited papers are organized in topical sections on algorithm improvements, alternative methods, applications, engineering design, many objectives, objective handling, and performance assessments.

Evolutionary computation (EC) techniques are efficient nature-inspired planning and optimization methods based on the principles of natural evolution and genetics. Due to their efficiency and the simple underlying principles, these methods can be used for a large number of problems including solving optimization and machine learning. A large and continuously increasing number of researchers and practitioners make use of EC techniques in many application domains. The book at hand presents a careful selection of relevant EC applications combined with thorough examination of the current state of the art in the application of EC and should help and inspire researchers and practitioners to develop efficient EC methods for design and problem solving. All papers in this book were presented during EvoApplications 2010, which included a range of events on application-oriented aspects of EC. Since 1998, EvoApplications - formerly known as EvoWorkshops - has provided a unique opportunity for EC researchers to meet and discuss application aspects of EC and has been an important link between EC research and its application in a variety of different domains.

Evolutionary Computation (EC) deals with problem solving, optimization, and machine learning techniques inspired by principles of natural evolution and genetics. Just from this basic definition, it is clear that one of the main features of the research community involved in the study of EC is multidisciplinary. For this reason, EC has been able to draw the attention of an ever-increasing number of researchers and practitioners in several fields. In its 6-year-long activity, EvoNet, the European Network of Excellence in Evolutionary Computing, has been the natural reference point for a multifaceted community. EvoNet has provided logistic and material support for those who were already involved in EC but, in the first place, it has had a critical role in favoring the significant growth of the EC community and its interactions with longer-established ones. The main instrument has been the series of events, first organized in 1998, that have spanned over both theoretical and practical aspects of EC. Ever since 1999, the present format, in which the EvoWorkshops, a collection of workshops on the most application-oriented aspects of EC, act as satellite events, very successful and very representative of the multi-disciplinarity of EC. Up to 2003, the core was represented by EuroGP, the main European event dedicated to Genetic Programming. EuroGP has been joined as the main event in 2004 by EvoCOP, formerly part of EvoWorkshops.

Evolutionary Computation in Combinatorial Optimization

7th International Conference, SEAL 2008, Melbourne, Australia, December 7-10, 2008, Proceedings

Evolutionary Computation in Scheduling

Artificial Intelligence and Its Applications

Swarm, Evolutionary, and Memetic Computing

EvoWorkshops: EvoBIO, EvoCOMNET, EvoHot, EvoIASP, EvoMUSART, and EvoSTOC

Nature-inspired Methods for Stochastic, Robust and Dynamic Optimization

Evolutionary Computation for Dynamic Optimization Problems Springer

We describe in this book, recent developments on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas such as, intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book contains a collection of papers focused on hybrid intelligent systems based on soft computing. There are some papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. There are also some papers that present theory and practice of meta-heuristics in different areas of application. Another group of papers describe diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications. There are also some papers that present theory and practice of neural networks in different areas of application. In addition, there are papers that present theory and practice of optimization and evolutionary algorithms in different areas of application. Finally, there are some papers describing applications of fuzzy logic, neural networks and meta-heuristics in pattern recognition problems.

Studies on Memory, Diversity and Prediction

Third International Workshop, ANTS 2002, Brussels, Belgium, September 12-14, 2002. Proceedings

Simulated Evolution and Learning

Evolutionary Optimization Algorithms