

# Utilizing Problem Structure in Local Search: The Planning Benchmarks as a Case Study

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# Utilizing Problem Structure In Planning A Local Search Approach

**Christian Drosten**



## **Utilizing Problem Structure In Planning A Local Search Approach:**

Utilizing Problem Structure in Planning Jrg Hoffmann,2003-10-10 Planning is a crucial skill for any autonomous agent be it a physically embedded agent such as a robot or a purely simulated software agent For this reason planning as a central research area of artificial intelligence from its beginnings has gained even more attention and importance recently After giving a general introduction to AI planning the book describes and carefully evaluates the algorithmic techniques used in fast forward planning systems FF demonstrating their excellent performance in many wellknown benchmark domains In advance an original and detailed investigation identifies the main patterns of structure which cause the performance of FF categorizing planning domains in a taxonomy of different classes with respect to their aptitude for being solved by heuristic approaches such as FF As shown the majority of the planning benchmark domains lie in classes which are easy to solve

**KI 2011: Advances in Artificial Intelligence** Joscha Bach,Stefan Edelkamp,2011-10-01 This book constitutes the refereed proceedings of the 34th Annual German Conference on Artificial Intelligence KI 2011 held in Berlin Germany in October 2011 The 32 revised full papers presented together with 3 invited talks were carefully reviewed and selected from 81 submissions The papers are divided in topical sections on computational learning and datamining knowledge representation and reasonings augmented reality swarm intelligence and planning and scheduling *Multi-Robot Task Allocation for Inspection Problems with Cooperative Tasks Using Hybrid Genetic Algorithms* Liu, Chun,2014 In this dissertation methods for optimal multi robot task allocation MRTA for industrial plant inspection are investigated MRTA involves distributing and scheduling a set of tasks for a group of robots to minimize the total cost taking into account operational constraints With technical progress and declining cost of robotic mobility interest in industrial mobile robotics has grown significantly in recent years Many efforts have been devoted to mobility related problems such as self localization and mapping though only few studies deal with the optimal task allocation in multi robot systems Since a good task allocation provides more efficient scheduling e g less cost shorter time the objective of this research is to develop search optimization methods for inspection problems that involve both single and two robot tasks *Handbook of Approximation Algorithms and Metaheuristics* Teofilo F. Gonzalez,2007-05-15 Delineating the tremendous growth in this area the Handbook of Approximation Algorithms and Metaheuristics covers fundamental theoretical topics as well as advanced practical applications It is the first book to comprehensively study both approximation algorithms and metaheuristics Starting with basic approaches the handbook presents the methodologies to design and analyze efficient approximation algorithms for a large class of problems and to establish inapproximability results for another class of problems It also discusses local search neural networks and metaheuristics as well as multiobjective problems sensitivity analysis and stability After laying this foundation the book applies the methodologies to classical problems in combinatorial optimization computational geometry and graph problems In addition it explores large scale and emerging applications in networks bioinformatics VLSI game

theory and data analysis Undoubtedly sparking further developments in the field this handbook provides the essential techniques to apply approximation algorithms and metaheuristics to a wide range of problems in computer science operations research computer engineering and economics Armed with this information researchers can design and analyze efficient algorithms to generate near optimal solutions for a wide range of computational intractable problems

*Proceedings of the Twenty-second AAAI Conference on Artificial Intelligence ,2007* *Formal Methods in Manufacturing Systems: Recent Advances* Li, Zhiwu,2013-05-31 Evolving technologies in mass production have led to the development of advanced techniques in the field of manufacturing These technologies can quickly and effectively respond to various market changes necessitating processes that focus on small batches of multiple products rather than large single product lines *Formal Methods in Manufacturing Systems Recent Advances* explores this shifting paradigm through an investigation of contemporary manufacturing techniques and formal methodologies that strive to solve a variety of issues arising from a market environment that increasingly favors flexible systems over traditional ones This book will be of particular use to industrial engineers and students of the field who require a detailed understanding of current trends and developments in manufacturing tools This book is part of the *Advances in Civil and Industrial Engineering* series collection [Emerging Research on Swarm Intelligence and Algorithm Optimization](#) Shi, Yuhui,2014-07-31 Throughout time scientists have looked to nature in order to understand and model solutions for complex real world problems In particular the study of self organizing entities such as social insect populations presents a new opportunity within the field of artificial intelligence *Emerging Research on Swarm Intelligence and Algorithm Optimization* discusses current research analyzing how the collective behavior of decentralized systems in the natural world can be applied to intelligent system design Discussing the application of swarm principles optimization techniques and key algorithms being used in the field this publication serves as an essential reference for academicians upper level students IT developers and IT theorists [Encyclopedia of Optimization](#) Christodoulos A. Floudas,Panos M. Pardalos,2008-09-04 The goal of the *Encyclopedia of Optimization* is to introduce the reader to a complete set of topics that show the spectrum of research the richness of ideas and the breadth of applications that has come from this field The second edition builds on the success of the former edition with more than 150 completely new entries designed to ensure that the reference addresses recent areas where optimization theories and techniques have advanced Particularly heavy attention resulted in health science and transportation with entries such as *Algorithms for Genomics Optimization and Radiotherapy Treatment Design and Crew Scheduling* *ECAI 2020* Giuseppe De Giacomo,Bistra Dilkina,Michela Milano,Senén Barro,Alberto Bugarín,Jérôme Lang,2020-09-15 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

**Optimization and Computing using Intelligent Data-Driven Approaches for Decision-Making** Irfan Ali,Umar Muhammad Modibbo,Asaju La'aro Bolaji,Harish Garg,2024-12-26 This book comprehensively discusses nature inspired algorithms deep learning methods applications of mathematical programming and artificial intelligence techniques It further covers important topics such as the use of machine learning and the Internet of Things and multi objective optimization under Fermatean hesitant fuzzy and uncertain environment This book Addresses solving practical problems such as supply chain management smart manufacturing and healthcare analytics using intelligent computing and discusses solving the fuzzy inference system in ant colony optimization for traveling salesman problem Presents an overview of artificial intelligence AI and explainable AI decision making XAIDM and illustrates a data driven optimization concept for modeling environmental and economic sustainability Discusses machine learning based multi objective optimization technique for load balancing in integrated fog cloud environment Explains the use of heuristics and metaheuristics in supply chain networks and the use of fuzzy optimization in sustainable development goals Discusses sustainable transit of hazardous waste green fractional transportation system perishable inventory M estimation of functional regression operator and intuitionistic fuzzy sets applications The text is primarily written for graduate students and academic researchers in diverse fields including operations research mathematics statistics computer science information and communication technology and industrial engineering

**Proceedings of the ... International Joint Conference on Artificial Intelligence** ,1999  
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**Proceedings of the ... IEEE Conference on Evolutionary Computation** ,1998 *1996 IEEE International Conference on Systems, Man and Cybernetics* ,1996

**Dissertation Abstracts International** ,2008  
*1998 IEEE International Conference on Evolutionary Computation Proceedings* IEEE Neural Networks Council,1998 This collection of papers from the ICEC conference covers a wide range of aspects of evolutionary computing This includes

principles of evolutionary computation such as adaptation and self adaption variation operators representational issues and theoretical investigations **American Book Publishing Record** ,2004 *Integrating meta-heuristics and a Sarsa algorithm for disassembly scheduling problems with cycle time and hazard coefficients* Dachao Li,Kaizhou Gao,Yaxian Ren,Ruixue Zhang,Yaping Fu,2024-01-29 End of life products recycling can reduce the waste of resources and disassembly line scheduling planning can effectively improve the recycling efficiency and reduce the pollution of the environment This work addresses a bi objective disassembly line scheduling problem with considering time interference between tasks The weighted sum of the cycle time and hazard coefficients is optimized First a mathematical model of the disassembly line scheduling problem is established under the constraints of priority and time interference relationships Second four meta heuristics are improved to solve the concerned problems including particle swarm optimization artificial bee colony genetic algorithm and variable neighborhood search Ten objective oriented local search operations are designed for improving meta heuristics performance A reinforcement learning algorithm Sarsa is employed to guide task assignment among workstations and local search selection during iterations respectively Finally experiments are carried out for 10 instances with different scales The effectiveness of the improving strategies is verified the meta heuristics combined with Sarsa based task assignment and local search strategies has better robustness and stability than the classical ones Comparisons and discussions show that the particle swarm optimization with improved strategies outperforms other algorithms **IJCAI-99** Thomas L. Dean,1999

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