1. Record Nr. UNINA9910985986903321

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Titolo	Algorithmic Foundations for Social Advancement : Recent Progress on Theory and Practice / / edited by Shin-ichi Minato, Takeaki Uno, Norihito Yasuda, Takashi Horiyama, Ken-ichi Kawarabayashi, Shigeru Yamashita, Hirotaka Ono
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2025
ISBN	9789819606689 9819606683
Edizione	[1st ed. 2025.]
Descrizione fisica	1 online resource (541 pages)
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Disciplina	004.0151
Soggetti	Computer science Algorithms Theory and Algorithms for Application Domains
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Overview of Algorithmic Foundations for Social Advancement (AFSA) Project -- Motivating Problems and Algorithmic Solutions -- ZDDs and Frontier-Based Search for Solving Combinatorial Problems -- Graphillion: Combinatorial Solver for Graph Problems -- Interdisciplinary Discussions for Future Computer Science -- Methodologies for Fruitful Interdisciplinary Discussions -- Catalog of Problems for Future Computer Science -- Continuous Interval Hamming Distance-based Measures -- Optimization Problem Formulations for Overcoming Difficulties in Real-world Projects -- Analysis of 20th French Philosophers Network -- Social Media Analysis based on Humanities Reading Technique: Developing a Method for Measuring Slanderous Narratives Online -- Reframing Problems: Analyzing the Design of Mixed Reality Tools Through the Lens of Fictionality --

Solving Rep-tile by Computers: Performance of Solvers and Analyses of Solutions -- Parallel Redundancy Removal in lrslib with Application to Projections -- Bridging Algorithmic Foundations with Information Security and Privacy: Set-k-Multicover Problem and Homomorphic Secret Sharing -- A Survey: SWAP Test and Its Applications to Quantum Complexity Theory -- Recent developments in quantum distributed algorithms -- On the simulation and verification of noisy quantum circuits -- Succinct Representations of Graphs -- A Satisfiability Algorithm for Depth Two Circuits with a Sub-Quadratic Number of Symmetric and Threshold Gates -- Soft margin boosting as Frank-Wolfe Algorithms -- Cost Graph Colorings -- Perpetual scheduling under frequency constraints.

Sommario/riassunto

This Open access book provides an overview of the cutting-edge research to systematize innovative foundations in algorithmic theories and techniques, and apply them to solve socially significant real-life problems, thereby driving social transformation and advancement. Formulating such social problems into well-defined mathematical or computational terms requires not only a solid theoretical foundation but also a deep understanding of the application domain itself. The content is divided into three parts. Following an introductory chapter in Part I, Part II discusses how to bridge the gap between algorithmic solutions and social advancement. Chapters 2, 3, and 4 present motivating problems that showcase the remarkable performance improvements driven by algorithmic technologies, followed by examples of how interfaces and tools were provided to apply these solutions to real-world challenges. The subsequent Chapters 5 through 12 then focus on interdisciplinary discussions regarding how to formulate real societal issues into a catalog of problems to be addressed. Finally, Part III, spanning Chapters 13 to 23, highlights selected topics on the innovative algorithmic foundations developed through the research project, focusing on intriguing subjects and the latest ongoing research. These include processing large-scale discrete structures, graph algorithms, discrete optimization, quantum algorithms, and various other topics related to algorithmic foundations. This book will serve as a valuable resource for readers interested in the use of algorithms in real-life problems. This book is based on the research project in Japan, Algorithmic Foundations for Social Advancement.