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Approximation and Online Algorithms

19th International Workshop, WAOA 2021
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Revised Selected Papers

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Preface

The 19th Workshop on Approximation and Online Algorithms (WAOA 2021) focused on the design and analysis of algorithms for online and computationally hard problems. Both kinds of problems have a large number of applications in a variety of fields. Due to the COVID-19 pandemic, WAOA 2021 took place virtually in Lisbon, Portugal, during September 9–10, 2021, and was a success: it featured many interesting presentations and provided opportunity for stimulating interactions. WAOA 2021 was part of the ALGO 2021 event that also hosted ESA, ALGOCLOUD, ALGOSENSORS, and ATMOS.

Topics of interest for WAOA 2021 were as follows: graph algorithms, inapproximability results, network design, packing and covering, paradigms for the design and analysis of approximation and online algorithms, parameterized complexity, scheduling problems, algorithmic game theory, algorithmic trading, coloring and partitioning, competitive analysis, computational advertising, computational finance, cuts and connectivity, geometric problems, mechanism design, resource augmentation, and real-world applications.

In response to the call for papers we received 31 submissions. Each of the submissions was reviewed by at least three referees, and many of the submissions were reviewed by more than three referees. The submissions were mainly judged on originality, technical quality, and relevance to the topics of the conference. Based on the reviews, the Program Committee (PC) selected 16 papers. This volume contains final revised versions of these papers as well as an invited contribution by our invited speaker Daniel Lokshtanov. The EasyChair conference system was used to manage the electronic submissions, the review process, and the electronic Program Committee discussions. It made our task much easier.

We would like to thank all the authors who submitted papers to WAOA 2021 and all attendees of WAOA 2021, including the presenters of the accepted papers. A special thank you goes to the plenary invited speaker Daniel Lokshtanov for accepting our invitation despite the uncertainty involved due to the pandemic and giving a very nice talk. We would also like to thank the PC members and the external reviewers for their diligent work in evaluating the submissions and their contributions to the electronic discussions. Furthermore, we are grateful to all the local organizers of ALGO 2021, especially the general chair of the organizing committee, Arlindo Oliveira.

September 2021

Jochen Könemann
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How to Navigate Through Obstacles (and How to Place Them) (Invited Talk)

Daniel Lokshtanov

Department of Computer Science, University of California at Santa Barbara, California, USA

Abstract. Consider an agent that has to move from a source point s to a destination point t through an environment. The environment can be the plane, multidimensional space, or a graph. Suppose now that the environment is littered with (possibly overlapping) obstacles that obstruct the path from s to t. What is the minimum number of obstacles that has to be removed so that the agent can move unobstructed from the source to the destination? This is a fundamental problem with applications ranging from sensor networks to robotics, and it has been intensively studied under different names. In this talk we will survey the state of the art for the problem, from the perspective of approximation algorithms, hardness of approximation, and parameterized algorithms. We will also consider the dual problem of placing the minimum number of obstacles between the source and the destination so that there is no un-obstructed path from the source to the destination.

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