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WALCOM: Algorithms and Computation

15th International Conference and Workshops, WALCOM 2021
Yangon, Myanmar, February 28 – March 2, 2021
Proceedings

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Preface

The 15th International Conference and Workshop on Algorithms and Computation (WALCOM 2021) was held at University of Information Technology, Yangon, Myanmar during February 28 – March 2, 2021. The conference covered diverse areas of algorithms and computation, that is, approximation algorithms, algorithmic graph theory and combinatorics, combinatorial algorithms, combinatorial optimization, computational biology, computational complexity, computational geometry, discrete geometry, data structures, experimental algorithm methodologies, graph algorithms, graph drawing, parallel and distributed algorithms, parameterized algorithms, parameterized complexity, network optimization, online algorithms, randomized algorithms, and string algorithms. The conference was organized in cooperation between University of Information Technology and Japan Advanced Institute of Science and Technology. Due to COVID-19, it was held online.

This volume of *Lecture Notes in Computer Science* contains 24 contributed papers that were presented at WALCOM 2021. There were 60 submissions from 21 countries. Each submission was reviewed by at least three Program Committee members with the assistance of external referees. Among them, the following paper was selected as the best paper: “On Compatible Matchings” by Oswin Aichholzer, Alan Arroyo, Zuzana Masárová, Irene Parada, Daniel Perz, Alexander Pilz, Josef Tkadlec, and Birgit Vogtenhuber. The volume also includes the abstract and the extended abstracts of three invited talks presented by Mohammad Kaykobad, Tetsuo Asano, and Erik D. Demaine. Two special issues, one of Theoretical Computer Science and one of the Journal of Graph Algorithms and Applications contained some selected papers among those presented at WALCOM 2021.

We wish to thank all who made this meeting possible: the authors for submitting papers, the Program Committee members and external referees (listed in the proceedings) for their excellent work, and our three invited speakers. We acknowledge the Steering Committee members for their continuous encouragement and suggestions. We also wish to express our sincere appreciation to the sponsors, local organizers, Proceedings Committee, and the editors of the *Lecture Notes in Computer Science* series and Springer for their help in publishing this volume. We especially thank Saw Sanda Aye, Wint Thida Zaw, Tin Htar Nwe, and their team at University of Information Technology for their tireless efforts in organizing this conference. Finally, we thank the EasyChair conference management system, which was very effective in handling the entire reviewing process.

March 2021

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Understanding the Complexity of Motion Planning (Abstract of Invited Talk)

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Abstract. Motion planning of simple agents (robots, humans, cars, drones, etc.) is a major source of interesting algorithmic and geometric problems. We'll describe results for a variety of models ranging in number of agents and amount of available control, focusing on recent results. A single agent represents many single-player video games, as well as your daily life. With multiple agents, the amount of control can vary from moving one agent at a time (as in, e.g., Checkers or Chess, recently proved NP-hard even for a single move) to global control of all agents (as in the puzzle board game Tilt, recently proved PSPACE-complete) to simultaneous parallel control of all agents (recently proved to have a constant-factor approximation algorithm). Along the way, we'll describe a growing theory of “gadgets” aiming to characterize the complexity of motion planning problems.

Keywords: Gadgets · Motion planning · Computational complexity

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