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Editorial

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This special issue contains the journal versions of a selection of papers from the 19th European Symposium on Algorithms (ESA), which was held September 5–7, 2011 in Saarbrücken, Germany. The European Symposium on Algorithms is one of the premier algorithms conferences worldwide, featuring high-quality papers on efficient algorithms and data structures in computer science, discrete applied mathematics, and operations research. ESA publishes both theory-oriented papers (in the Design and Analysis Track) and experimentation-oriented papers (in the Engineering and Applications Track). For this special issue six excellent papers were selected, four from the Design and Analysis Track and two from the Engineering and Applications Track. All papers went through the thorough reviewing process that is standard for articles published in Algorithmica.

The power of randomization is a fundamental question in computer science. Discrepancy of a set system is a problem that has for long admitted only existential bounds based on the probabilistic method. In their article *Deterministic Discrepancy Minimization*, Bansal and Spencer show how a recent randomized algorithm of Bansal can be derandomized to obtain a deterministic algorithm for discrepancy. They add constraints to the natural semi-definite program for discrepancy in order to show that iteratively updating a fractional solution succeeds on two fronts: maintaining small accumulated discrepancy, and making progress toward an integral solution.

Oveis Gharan and Vondrák present *On Variants of the Matroid Secretary Problem*, which considers variations of the matroid generalization of the classic secretary

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problem. They address different cases depending on adversarial or random order of the elements in the input and/or their weights, as well as depending on the prior information on the matroid or the cardinality of the ground set. They give five new upper bounds and four new lower bounds on the approximability of different variants. Most notably, they obtain a constant-factor competitive algorithm for case when weights are assigned randomly but elements arrive online in adversarial order, assuming that the matroid is known in advance.

Jez considers online algorithms for a packet scheduling problem against an adaptive adversary in his article *A Universal Randomized Packet Scheduling Algorithm*. The problem addressed is that of deciding in each step which packet to forward and which packets to keep in the limited buffer, so as to maximize the total weight of packets forwarded before their deadline. Jez's algorithm unifies most of the previously known randomized algorithms and its general analysis yields improved performance bounds for several restricted variants.

Distance oracles are compact data structures for querying approximate distances in a graph. In their article *Preprocess, set, Query!*, Porat and Roditty extend the seminal work of Thorup and Zwick to allow for better bounds on the distance approximation, or "stretch", at the cost of increased query time. In particular, they achieve a multiplicative stretch of 1.75 with non-trivial bounds on space and query time.

String processing and searching are fundamental issues in modern information retrieval and data mining applications. Ferragina, Sirén, and Venturini address the problem of building a compressed self-index that, given a distribution for queries, minimizes the expected query time under a given space bound. In their article *Distribution-Aware Compressed Full-Text Indexes*, the authors devise an efficient solution based on a reduction to the problem of finding a minimum-cost k-link path in a directed acyclic graph. A thorough experimental comparison of the proposed strategy with several other known approaches shows its practical effectiveness.

Motion planning is a core problem in robotics with applications in different domains such as surgical planning, computer graphics, computational biology, and computer gaming. In their article *Motion Planning via Manifold Samples*, Salzman, Hemmer, Raveh, and Halperin make a significant step forward towards the goal of achieving a modular and efficient programming framework for path planning of robots. The framework integrates geometric techniques for low-dimensional configuration spaces with simple and practical sampling-based approaches for higher dimensions. As an algorithm engineering case study, the authors consider the concrete scenario of a polygonal robot translating and rotating in a space with polygonal obstacles.

Together these six beautiful articles show the breadth and the depth of algorithms research in general, and of the European Symposium on Algorithms in particular.

We would like to thank all authors for submitting their articles to this special issue and all the referees for their careful reviews. Also, we are grateful to the editor-in-chief Ming-Yang Kao for giving us the opportunity to edit this special issue. Finally, we hope that the readers will find the articles presented in this volume interesting and enjoyable.

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