Editorial: Special Issue on the Best Papers from the 2018 ACM SIGSPATIAL Conference

This special issue contains extended versions of the best papers from the 2018 ACM SIGSPATIAL conference. Six papers have been recommended by the program committee co-chairs of the conference: Professors Ralf Hartmut Güting (FernUniversität in Hagen), Roberto Tamassia (Brown University), and Li Xiong (Emory University). These papers have received the highest ranks by the conference's program committee members and have also been endorsed by the PC co-chairs. Authors of all six conference papers have extended their papers and have submitted the extended versions for possible publication in ACM TSAS. To qualify for publication in ACM TSAS, one important criterion is that the extended version includes at least 30% new material over the published conference version of the paper. The reviewers and the editorial board of ACM TSAS are the ones to decide on this issue, as well as assess the significance of the newly added material. Another important criterion is that these extended versions should not have been published formerly in any other publication venue. To speed up the review process, and with the help of the PC co-chairs of the SIGSPATIAL Executive Committee, I selected the same set of reviewers who reviewed the conference versions of the paper to review these extended versions to ensure that the extensions satisfy the criteria stated earlier. As needed, the papers went through several rounds of iterations until the reviewers and I were satisfied with the revisions. This issue of ACM TSAS includes the six journal versions of the papers that have been accepted to this special issue of the best papers from the 2018 ACM SIGSPATIAL conference. The articles are not listed in any particular order of preference.

The first article, titled “[To Buy or Not to Buy: Computing Value of Spatiotemporal Information](#),” by Heba Aly, John Krumm, Gireeja Ranade, and Eric Horvitz, studies the intrinsic value of location data in the context of strong privacy, where location information is only available from end users via purchase. In particular, the article presents an algorithm to compute the expected value of location data from a user, without access to the specific coordinates of the location data points, which makes this article an interesting read.

The second article, titled “[Stepping Stone Graph: A Graph for Finding Movement Corridors Using Sparse Trajectories](#),” by Sameera Kannangara, Egemen Tanin, Aaron Harwood, and Shanika Karunasekera, studies the problem of identifying movement corridors in cities given sporadic location data. The article proposes a new approach, termed the *stepping stone graph*, that calculates the graph considering point pairs rather than all points. The stepping stone graph focuses on possible local movements, making it an efficient and effective approach for location-based social networks.

The third article, titled “[A Data-Driven Framework for Long-Range Aircraft Conflict Detection and Resolution](#),” by Samet Ayhan, Pablo Costas, and Hanan Samet, studies the problem of long-range aircraft conflict detection and resolution. In particular, the article studies how to detect when a protected zone of an aircraft on its trajectory is infringed upon by another aircraft, and how to resolve this conflict. What makes the presented algorithms interesting is the data-driven approach that utilizes hidden Markov models to learn patterns of historical trajectories. Moreover, the article introduces a variant of the Viterbi algorithm that avoids the airspace volume in which the conflict is detected and generates a new optimal trajectory that is conflict free.

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The fourth article, titled “[Efficient Generation of Geographically Accurate Transit Maps](#),” by Hannah Bast, Patrick Brosi, and Sabine Storandt, studies techniques for generating geographically accurate transit maps. Given as input data about the lines of a transit network, the article applies transformation rules and an improved formulation based on integer linear programming to efficiently compute optimal line orderings.

The fifth article, titled “[Flood-Risk Analysis on Terrains Under the Multiflow-Direction Model](#),” by Aaron Lowe and Pankaj Agarwal, studies flood risk-related problems, mainly how water flows across a terrain and creates floods by filling up depressions. In particular, the article presents efficient algorithms that address several interesting flood risk-related problems including determining the volume of rain that must fall before certain points in the terrain become flooded. What makes this article an interesting read is the complexity analysis of these algorithms and how they advance over the state-of-the-art algorithms.

Last but not the least, the sixth article, titled “[RegRocket: Scalable Multinomial Autologistic Regression with Unordered Categorical Variables Using Markov Logic Networks](#),” by Ibrahim Sabek, Mashaal Musleh, and Mohamed F. Mokbel, studies statistical tools for predicting spatial phenomena. In particular, the article introduces multinomial autologistic models for predicting large-scale spatial phenomena. The proposed techniques are unique in that they address both the accuracy and efficiency aspects when learning the regression model parameters.

It is my hope that the readers enjoy reading these articles and find them interesting. Thanks are due to all authors who have submitted their papers to this special issue on time and to the 2018 SIGSPATIAL conference PC co-chairs who have helped select this interesting set of best papers. I would like to express my sincere gratitude to the reviewers for providing high-quality reviews in a timely fashion to enhance the quality of the accepted papers. Finally, it is my hope that this collection of articles will facilitate further research in this exciting area of spatial algorithms and systems.

Walid G. Aref
Editor-in-Chief