

The 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)

Marc van Kreveld¹, Bettina Speckmann², Matei Stroila³, Goce Trajcevski⁴

¹Department of Information and Computing Sciences, Utrecht University, the Netherlands

²Department of Mathematics and Computer Science, TU Eindhoven, the Netherlands

³ HERE Technologies, Chicago, USA

⁴Software Engineering Program, Iowa State University, Ames, USA

1 Introduction

Modern technology allows us to track essentially anything that moves, be it animals, people, vehicles, or hurricanes. As a result, many efficient computational methods have been developed to analyze movement data, including methods for similarity analysis, clustering, segmentation, classification, and pattern detection. However, movement rarely occurs in isolation and to truly understand movement data it is of paramount importance to understand the intrinsic and extrinsic factors that influence movement, such as or health conditions or motivation (intrinsic) or the (natural) environment, weather, and other surrounding entities (extrinsic). Often the data that describes these factors is available together with the tracked object data for analysis, but comparatively few computational techniques fully utilize the potential of such multifaceted data. This workshop brought together researchers who are interested in developing computational techniques to analyze movement data in conjunction with other data sources that capture (some of) the factors which influence movement.

2 Preparing the program

To select contributed talks for the workshop, a program committee was formed, consisting of a representative selection of active researchers in the workshop topic. The call for papers was distributed several months before the workshop, and eight submissions were received. One submission clearly did not follow the submission guidelines and was out of scope, so it did not enter the reviewing process. The other seven submissions were reviewed by three PC members each. The PC provided high-quality feedback in their reports, which helped to improve the quality of the submitted papers. In case of disagreements between PC members, we followed a discussion cycle to assess how severe shortcomings of the papers were. Then we cleaned up the reviews to ensure positive or constructive feedback only. The PC members are:

- Maike Buchin, Ruhr-University Bochum, Germany
- Somayeh Dodge, University of California, Santa Barbara, USA
- Christian S. Jensen, Aalborg University, Denmark
- Marc van Kreveld, Utrecht University, the Netherlands (chair)
- Wouter Meulemans, TU Eindhoven, the Netherlands
- Bettina Speckmann, TU Eindhoven, the Netherlands

- Matei Stroila, HERE, Chicago, USA
- Goce Trajcevski, Iowa State University, Ames, USA
- Rob Weibel, University of Zurich, Switzerland

The process led to the acceptance of five submissions and the rejection of two. The accepted submissions were revised for publication in the ACM Digital Library, as was an abstract from the invited speaker.

3 The workshop

The workshop was held as a half-day event just before the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL 2019) in Chicago on Tuesday, November 5 in the afternoon. 24 people attended the workshop, in nearly all cases for the full duration. The five contributed talks were 20 minutes long; the invited talk was 55 minutes long. This included time for questions. As the last scheduled part of the workshop, time was reserved for around-the-table discussions with the presenters, who each sat at different tables and discussed with several of the participants. This was a nonstandard item of a typical workshop, and we were happy to see that it was appreciated by the workshop attendees.

The first paper, entitled “Understanding Movement in Context with Heterogeneous Data”, addressed nine main challenges in movement, focusing on mobility and heterogeneity [2]. The second paper, entitled “Shared Micro-mobility Patterns as Measures of City Similarity”, explored the possibilities of using e-bike and e-scooter data to understand and compare cities [5]. The third paper, entitled “Inferring Semantically Enriched Representative Trajectories”, assumed that a cluster of similar trajectories is enriched with semantic information and considered how this can help in computing a median trajectory for that cluster [6]. The fourth paper, entitled “Latent Terrain Representations for Trajectory Prediction”, addressed the interplay between terrain and chosen trajectories by vehicles or on foot, in order to predict traversed paths [3]. The fifth paper, entitled “A Repository of Network-Constrained Trajectory Data”, discussed the challenges involved in setting up a repository of trajectories constrained to a network (often road network) while supporting the most important query types [4]. Finally, the invited presentation, entitled “Location Graphs for Movement Data Modeling, Analytics, and Visualization”, addressed the representation of context data that may influence movement, including the spatial, temporal, and semantic component [1].

All papers together revealed that there are many facets of multifaceted movement data computation and analysis that give rise to interesting and innovative research.

The workshop organizers thank all submitters, presenters, PC members, and participants for their contributions to this successful workshop.

References

- [1] Craig Barnes. Location graphs for movement data modeling, analytics, and visualization. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*, 2019.
- [2] Onur Derin, Aniket Mitra, Matei Stroila, Bram Custers, Wouter Meulemans, Marcel Roeloffzen, and Kevin Verbeek. Understanding movement in context with heterogeneous data. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*.
- [3] Andrew Feng and Andrew S. Gordon. Latent terrain representations for trajectory prediction. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*, 2019.

- [4] Stefan Funke and Sabine Storandt. A repository of network-constrained trajectory data. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*, 2019.
- [5] Grant McKenzie. Shared micro-mobility patterns as measures of city similarity. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*, 2019.
- [6] Jana Seep and Jan Vahrenhold. Inferring semantically enriched representative trajectories. In *Proc. 1st ACM SIGSPATIAL International Workshop on Computing with Multifaceted Movement Data (MOVE++ 2019)*, 2019.