

## Letter from the Special Issue Editor

Among all types of big data available to us today, two types of data are in abundance and closely related with each other: social media data and location data. Both types of data are rich in information but are highly challenging to process. The best value derivable from these two types of data can be achieved once they are considered together. This special issue on the topic of location-based social media analysis reports the latest advances from leading researchers in this area for managing and analyzing these two type of data in a holistic approach.

The past decade has witnessed the phenomenal success of online social networks (OSN) with billions of users across various platforms, on which anyone is able to create and share any kind of information (news, articles, images, videos) to her connections, leading to a huge amount of social media data. The current pervasiveness of GPS-enabled mobile devices and the fact that all the giant social networks have also gone mobile have empowered people to add a location dimension to existing online social networks in a variety of ways. For example, users can upload geo-tagged photos/videos to Flickr, Instagram or Vimeo to share their great moment with friends, comment on an event in Twitter with geo-tagged tweets, share what they think about a restaurant on Foursquare, or log bicycle trails for sport analysis and experience sharing on Bikely. These kinds of location-embedded and location-driven social structures are known as location-based social networks (LBSN), while the geo-tagged social media is often referred to as location-based social media. Compared to traditional online social networks where peoples relationships in the virtual world may not necessarily correspond to those in the real world, the location dimension bridges the gap between online social networks (aka virtual world) and their real lives (aka real world). Moreover, as location is one of the most important components of user context, incorporating locational information while analyzing online social networks enables a deeper understanding of user preferences and behavior in the physical world. The enormous volume, fine granularity and heterogeneous formats of location-based social media have brought us unprecedented opportunities to, for the first time, study and understand humans social behavior with the scale and depth that could not possibly be achieved in the past. This special issue consists of seven articles from leading researchers geared towards the recent development and new frontiers of models, algorithms, applications and systems for location-based social media analysis.

The special issue starts with three survey-styled articles that review and summarize the challenges and state-of-the-art technologies in dealing with location-based social media data. The article *Discovering Location Information in Social Media* introduces some recent analytical techniques that leverage geographical information in social media to make recommendations and predictions. It then moves on to discussing how machine learning methods can be applied to infer the location of a social media post so that the prior analysis can be carried onto the entirety of social media data, rather than just those explicitly tagged with geographic information. In the second article *Inferring Real-World Relationships from Spatiotemporal Data*, the authors survey the related techniques pursuing the inference of the real-world social connections and social strength from spatio-temporal data that are generated from location-based social networks. The last article in this set *Go Beyond Raw Trajectory Data: Quality and Semantics* first points out the limitations of traditional techniques for processing raw trajectory data in coping with the spatio-temporal data in the context of LBSNs due to the lack of quality control mechanism and semantic information. The authors then review their recent work on enhancing the quality of trajectory data and utilizing the semantic information that are readily available in location-based social media to improve the interpretability of trajectory search results.

The next set of two papers mainly focuses on location-based social network mining by applying different machine learning models and techniques. In the article *Mining Location-based Social Networks: A Predictive Perspective*, the authors adopt supervised learning models to predict the future locations for users with regular mobility patterns and irregular mobility patterns respectively. Afterwards they discuss how to characterize the novelty-seeking propensity of LBSN users, which is used to prioritize the corresponding prediction models and rank the locations for recommendation. The paper *Clustering in Geo-Social Networks*, on the other hand, applies an unsupervised learning method (i.e., clustering) to find groups of places in an LBSN that share similar geo-

social attributes and structures, which can benefit applications like marketing campaign, urban planning, travel recommendation and so on.

The last two articles concern new techniques of analyzing microblogs by taking the space-time attribute into consideration. In the article entitled Space-Time Aware Behavioral-Topic Modeling for Microblog Posts, the authors model the topic of a microblog post where associated information in the form of timestamps, geo-locations and user interactions (i.e., reply, re-tweet) is available. The article Taqreer: A System for Spatio-temporal Analysis on Microblogs introduces their recent development for Taqreer, which is a scalable and efficient system for auto-generation of spatio-temporal analysis reports on large number of microblogs. Database technologies including indexing structures, flushing strategies, query optimization and recovery management have been employed and integrated into the query processing engine in order to deal with microblogs with high arrival rate and volume.

Irrespective of the nature of the papers, collectively they provide a good view of the state-of-the-art thoughts and research in the area of location-based social media analytics. I hope you enjoy reading these articles!

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