

Preface: special issue on geo-social media analytics

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Advancements in communication infrastructures and low access barriers to communication sinks (e.g., personal mobile devices) have dramatically increased the size and reach of open source data such as those observed in social media: Twitter feeds, user blogs, Flickr images, and others. In several cases, the data have been implicitly or explicitly encoded with spatial and temporal attributes manifested in a variety of forms such as place names in Tweets and GPS coordinates in Flickr. Exploiting the open source data in conjunction with their spatiotemporal contexts can enhance our understanding of the physical environment, societal condition, and the dynamic and complex relationships between them. For example, in the context of disaster response, Twitter feeds and Flickr imageries can provide a rich and valuable avenue for monitoring the spatial distribution of affected areas and population sentiments to positively impact relief efforts such as the one caused by Hurricane Sandy. Also, during Arab Spring, the geographic evolution of population attitudes as observed in various social mediums can provide effective indicators of demonstrations and protests. These examples underline the importance of geo-social media in bringing awareness, insights, and decisions to impact these major events.

This special issue includes five articles delving on the following themes of geo-social media data: understanding complex patterns and relationships between humans and their environment,

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addressing the challenges of highly skewed data availability and distributions, optimizing analytical models to handle continuously evolving data, inferring and extracting implicit and ambiguous spatiotemporal attributions, and providing robust analytics in noisy data.

The paper by Guo et al. (“Human Mobility Semantics Analysis: a Probabilistic and Scalable Approach”) leverages full Bayesian sequential modeling to discover cascading movement patterns in highly noisy mobile data. Another important form of geo-social data is location-based social network (LBSN). The paper by Li et al. (“Assessing spatiotemporal predictability of LBSN: A case study of three Foursquare datasets”) performs data analysis to understand and quantify the spatiotemporal predictability of LBSN. Extracting and estimating the underlying correlation within the data allows for a realistic assessment on the quality of predictions that can be made from applicable techniques.

Geocoding in social media data has attracted tremendous attention due to the improved analysis that can be brought to bear with accurate spatial contextualization. The paper entitled “Strategies for Combining Twitter user geo-location methods” by Ribeiro and Pappa evaluates and compares sixteen existing methods for user location inference based on different information sources, and develops four methods to combine the outputs of the evaluated methods to improve accuracy and recall. A related topic, in the paper entitled “A Framework for Annotating OpenStreetMap Objects Using Geo-tagged Tweets” by Chen et al., proposes a comprehensive framework to integrate social media with OpenStreetMap (OSM) to derive knowledge about geographical objects, specifically, top relevant annotations from tweets for objects in OSM.

Lastly, focusing on developing fundamental computational methods to support automatic analyses is the paper by Kanza and Shalem (“Combined Geo-social Search: Computing Top-k Join Queries over Incomplete Information”). This paper studies how search queries based on spatial and social attributes can be performed efficiently and effectively in geo-social datasets that associate people and activities with locations.

We hope that these papers will inspire the scientific community to further conduct research in the area of geo-social media analytics. We are grateful to the authors and referees for their tremendous contributions and efforts towards making this special issue possible.

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