On the Activity Space derived Social Media: Recurrence, Temporal and Spatial Sensitivity Analysis

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Abstract

From the rise of Social Media, they have received attention from the scientific community, forming a potentially new stream of research. The reasons behind this attention can be summarized upon the unprecedented amount of information that can be extracted and the opportunities that Social Media platform use can provide on direct communication with users (Chaniotakis et al., 2016). The statistics of Social Media use are astonishing: on Twitter around 250,000 tweets are posted each minute; while almost 300,000 statuses are updated and about 136,000 photos are uploaded on Facebook (pewinternet.com). For transportation research Social Media has been found to be an inexpensive source of information concerning mobility patterns in urban and interurban settings (Chaniotakis et al., 2015; Lee et al., 2016), with one of the key benefits to be the spread distribution of identifiable activities on both temporal and spatial terms; difficult to obtain with traditional data collection methods. The nature of Social Media use, mainly focusing on sharing extraordinary activities such as leisure activities (Chaniotakis et al., 2017), allows for the exploration of features outside the conventional scope of transportation research, yet offering the potential of understanding the mobility context previously unexplored. One of these aspects is the exploration of the temporal and spatial dimensions of the individuals activity space.

In this study we aim to contribute with empirical evidences and analyses that would allow for a better understanding of the mobility patterns in terms of activity space and activity identification from Social Media. We base our analysis on data collected from a selection of 10 cities around Europe and the USA (Figure bellow) and collect data from the formed users' sample (Chaniotakis and Antoniou, 2015).
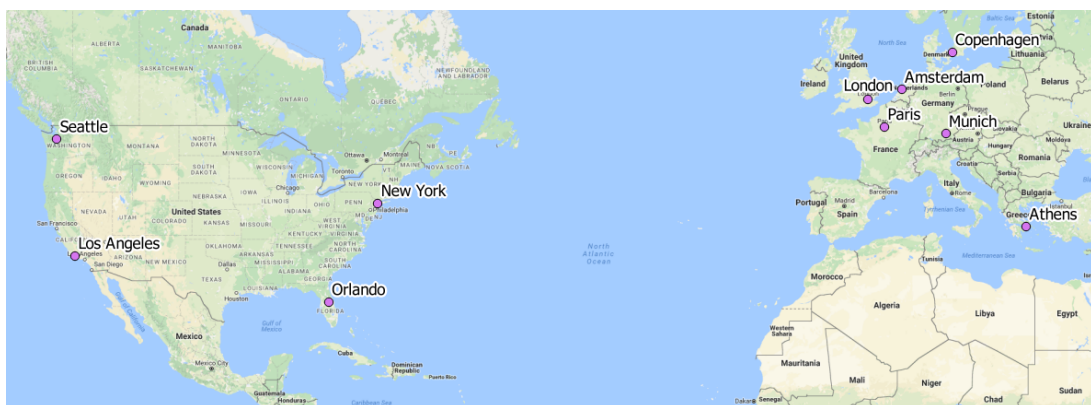
Performing a user-centric sensitivity analysis based on the temporal, activity characteristics, location recurrence clusters and spatial settings, we identify the pertinent features that shape

the activity space. The findings from the posting activity of individuals are inferred with socio-demographic characteristics aiming at generalizations concerning the sample differences among cities in relation to data availability and the potential latent variables hidden such as privacy concerns and technology aversion.

References

Chaniotakis, E. and Antoniou, C. (2015). Use of geotagged social media in urban settings: Empirical evidence on its potential from twitter. In *IEEE 18th International Conference on Intelligent Transportation Systems, (ITSC)*, pages 214–219. IEEE.

Chaniotakis, E., Antoniou, C., Aifadopoulou, G., and Dimitriou, L. (2017). Inferring activities from social media data. *Transportation Research Record: Journal of the Transportation Research Board, (accepted for publication)*.

Chaniotakis, E., Antoniou, C., and Mitsakis, E. (2015). Data for leisure travel demand from social networking services. In *4th hEART Symposium*. European Association for Research in Transportation - hEART, DTU, Denmark.

Chaniotakis, E., Antoniou, C., and Pereira, F. (2016). Mapping social media for transportation studies. *IEEE Intelligent Systems*, 31(6):64–70.

Lee, J. H., Davis, A., and Goulias, K. (2016). Activity space estimation with longitudinal observations of social media data. In *95th Annual Meeting of the Transportation Research Board. Washington, DC.*