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Mining Multiple Spatio-temporal Paths from Social Media Data

Hong Yao[a], Muzhou Xiong[a], Deze Zeng[a], Junfang Gong[b,*]

[a]*School of Computer Science, China University of Geosciences, Wuhan, China*
[b]*Faculty of Information Engineering, China University of Geosciences, Wuhan, China*

Abstract

The significance of characterizing people's daily activity has attracted lots of interests recently. Especially, excavating people's individual mobility pattern (IMP) has shown great potential in many application fields, e.g., transportation planning, activity prediction, supermarket location decision, etc. Social media has been widely regarded as an effective tool for IMP mining. Existing social media based IMP mining studies mainly focus on the spatial aspect (e.g., points-of-interests). Some recent studies argue that, besides spatial aspect, IMP also exhibits temporal feature, and therefore it is more significant to find out the spatio-temporal path (STP). We notice that these studies only can find out a single STP for each individual. While, in this paper, we argue that multiple STPs (mSTP) coexist and it is more rationale to find out the mSTP for each individual. However, this is a non-trivial task due to the inherent sparsity and uncertainness in the social media data. To address this problem, we propose a social media based mSTP mining framework. The spatial-temporal hotspots of individual activities are first clustered. Conditional probability is then applied to find out the mSTPs based on the hotspots. Trace-driven experiment results verify that the proposed method is able to correctly find out the mSTPs, which are consistent with human common sense. We also evaluate the correctness and accuracy of our model by several metrics.

*Corresponding author
Email address: jfgongcug@gmail.com (Junfang Gong)

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