

Mining Spatial-Temporal Movement Profile of Mobile Users for Social-Aware Applications

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Received 24 February 2011; Revised 28 April 2011; Accepted 25 May 2011

Abstract. The pervasiveness of sensors and location acquisition techniques enable more and more historical location logs, i.e., trajectory data, of moving objects can be collected. Currently, many users share their locations and trajectories to Webs. Such a movement sharing can be considered as a new kind of social-aware community. One may expect to search users with similar movement behavior or traveling interests in order to request some location dependent information and services. In order to explore the community in their movement, movement behavior mining for individual user is a fundamental and essential task. By exploring trajectory patterns from historical movement, prior works are able to construct a model to reflect the movement behavior. However, with an increasing amount of trajectory data, a huge number of trajectory patterns is expected. Furthermore, trajectory data has both spatial and temporal information. To enhance the accuracy and conciseness of movement behavior modeling, in this paper, we propose a spatial-temporal movement profile model (abbreviated as STMP) to capture movement behavior of objects. STMP is represented as a probabilistic suffix tree with spatial and temporal information of movements. With the nature of probabilistic suffix tree, STMP is able to summarize a large number of trajectory patterns into a compact model compared to association rule-based model proposed. By exploring both spatial and temporal features, the accuracy of STMP model can be improved. To evaluate our proposed STMP model, we conduct experiments on the synthetic datasets generate from real datasets. Experimental results show that the STMP model is able to reflect an object's movement behavior with a smaller storage requirement while still guaranteeing the accuracy of the model.

Keywords: Movement behavior, trajectory pattern mining, social-aware application

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