Feature Tendency Based Location Prediction in LBSNs

Zi Xing, Hui Tian, Tu Chen, Jing Zhang

State Key Laboratory of Networking and Switching Technology

Beijing University of Posts and Telecommunications, Beijing 100876, China

xingzi_cuc@163.com, tianhui@bupt.edu.cn, chentu_1991@163.com, jingzhang1919@bupt.edu.cn

***Abstract*— The development of location-based social networks (LBSNs) has brought in massive users' mobility data, providing an unprecedented opportunity to study human mobile behavior. However, the existing location prediction methods suffer from incompleteness of mobility data and disability of selecting the effective feature. To better understand and describe mobile behavior, users' multi-features are induced and reorganized comprehensively in this paper. Meanwhile, we propose a novel location prediction model, Powerful Feature Tendency Based Selection (PFTS), which is universal for all datasets with diverse features. Furthermore, the proposed model can self-adaptively select the feature with the most powerful tendency by comparing variance of visiting probability distribution. Based on the chosen features, our model automatically employs corresponding method to predict locations for various scenes. Using two real-world LBSNs datasets, the experiment results validate that the PFTS significantly outperforms state-of-the-art approaches in terms of prediction accuracy. The results also suggest that the feature tendency is efficient to capture users' mobile behavior for boosting prediction performances.**

***Keyword*—Location-based social networks, Location prediction, Mobile behavior, Self-adaptively select, Feature tendency**

Zi Xing received B.E. degree in Communication Engineering from Communication University of China in 2014. She is currently a M.S. candidate in State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications (BUPT). Her major interests are social networks, user behavior, link prediction and mobile networks.

Hui Tian received her M.S. degree in Micro-Electronics and Ph.D. degree in Circuits and Systems both from Beijing University of Posts and Telecommunications, China in 1992 and 2003, respectively. Currently, she is a professor at BUPT. Her current research interests mainly include LTE/4G/5G system design, the MAC protocols, resource scheduling, cross-layer design and cooperative communication in such systems, heterogeneous wireless networks, ad hoc and sensor networks, and common radio resource.

Tu Chen received B.E. degree in Communication Engineering from BUPT in 2013. He is currently a M.S. candidate in State Key Laboratory of Networking and Switching Technology, BUPT. His research interests include social networks, recommendation system, data mining.

Jing Zhang received B.E. degree in Communication Engineering from Xidian University in 2014. She is currently a M.S. candidate in State Key Laboratory of Networking and Switching Technology, BUPT. Her major interests are social networks, LBSN, HTML.