1. Time-aware User Modeling with Check-in Time Prediction for Next POI Recommendation

Xin Wang (1); Xiao Liu (2); Li Li (3); Xiao Chen (3); Jin Liu (1); Hao Wu (4)

Author affiliation: (1) Wuhan University, School of Computer, China (2) Deakin University, School of Information
Technology, Geelong, VIC, Australia (3) Monash University, Faculty of Information Technology, Melbourne, VIC,
Australia (4) Yunnan University, School of Information Science and Engineering, China

Abstract: POI (point-of-interest) recommendation as an important type of location-based services has received
increasing attention with the rise of location-based social networks. Although significant efforts have been dedicated
to learning and recommending users' next POIs based on their historical mobility traces, there still lacks consideration
of the discrepancy of users' check-in time preferences and the inherent relationships between POIs and check-in
times. To fill this gap, this paper proposes a novel recommendation method which applies multi-task learning over
historical user mobility traces known to be sparse. Specifically, we design a cross-graph neural network to obtain time-
aware user modeling and control how much information flows across different semantic spaces, which makes up the
inadequate representation of existing user modeling methods. In addition, we design a check-in time prediction task
to learn users' activities from a time perspective and learn internal patterns between POIs and their check-in times,
aiming to reduce the search space to overcome the data sparsity problem. Comprehensive experiments on two real-
world public datasets demonstrate that our proposed method outperforms several representative POI recommendation
methods with 8.93% to 20.21 % improvement on Recall@1, 5, 10, and 9.25% to 17.56% improvement on Mean
Reciprocal Rank. (0 refs)

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Uncontrolled terms: time-aware user modeling - time prediction - next POI recommendation - location-based services
- location-based social networks - POIs - historical mobility - users - check-in times - recommendation method -
multitask learning - historical user mobility - cross-graph neural network - user modeling methods - time perspective -
representative POI recommendation methods
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computing - C1140Z Other topics in statistics - C1160 Combinatorial mathematics - C5260B Computer vision and
image processing techniques - C6130 Data handling techniques
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