Tour Recommendation on Location-based Social Networks

[Extended Abstract]

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ABSTRACT

We propose two tour recommendation algorithms based on the Orienteering problem, and implement a tour recommendation framework that uses geo-tagged photos and Wikipedia to determine the travel histories and interests of tourists.

Categories and Subject Descriptors

H.2.8 [**Database Management**]: Database Applications - Data mining; H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval

General Terms

Algorithms, Experimentation, Measurement

Keywords

Tour Recommendation, Travel Itinerary, User Interests, Orienteering Problem, Flickr, Wikipedia, Social Networks

1. INTRODUCTION

For a visitor in a foreign city, it is a challenging task to plan a tour or itinerary that is customized to his/her interest preferences. Despite the availability of online resources, there are challenges in planning a customized tour, namely: (i) many travel guides recommend popular Points of Interest (POI) that are not personalized to the tourist's interest preferences; (ii) even with a list of POIs, it is a tedious task to construct an itinerary based on those POIs with the considerations of travelling time and specific starting/ending points. Our work addresses these challenges by proposing two algorithms based on variants of the Orienteering problem and implementing a tour recommendation framework (Fig. 1) that utilizes geo-tagged photos and Wikipedia.

2. PROPOSED APPROACH

We model the tour recommendation problem as a variant of the Orienteering problem [3], with a time/distance budget B, starting POI p_1 and destination POI p_N. Our goal is to recommend a tour $T = (p_1, ..., p_N)$ that maximizes POI popularity and tourist interest, while staying within the budget B. Specifically, we proposed the following algorithms:

- PersTour algorithm [2]: For recommending personalized tours with POIs and visit duration based on POI popularity and time-based user interests.
- TourRecInt algorithm [1]: For recommending customized tours with a mandatory POI category based on user/tourist interests.

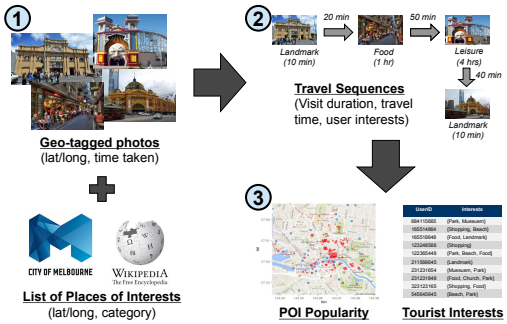

Figure 1: Tour Recommendation Framework

Our overall tour recommendation framework (Fig. 1) comprises the following steps:

1. Map geo-tagged photos (e.g. Flickr) to a list of POIs (e.g. Wikipedia) if their coordinates differ by <100m.
2. Construct the tourist travel history by connecting POI visits (obtained from Step 1) of the same tourist.
3. Calculate POI popularity and tourist interest preference based on tourist travel histories from Step 2.

Thereafter, we can apply our PersTour or TourRecInt algorithms to recommend customized tours.

3. EXPERIMENTS AND RESULTS

We evaluate the effectiveness of PersTour and TourRecInt against various greedy-based baselines on a Flickr dataset of multiple cities. Our experimental results show that PersTour and TourRecInt out-perform the baselines in terms of various evaluation metrics, namely: tour popularity, tour interest, POI count, precision, recall, F_1-score, and RMSE of visit duration.

For more information on our proposed algorithms and experimental results, please refer to [1] and [2].

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4. REFERENCES

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