Personalized and Ranking Travel Recommendation On Predict Of Multi Source Big Data

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Abstract— **Recommendation systems and adaptive systems have been introduced in travel application to sustain the travelers in their administrative process. Travel based suggestion and journey planning are demanding tasks because of various importance preferences and trip limitations such as restriction of time, source and destination points for each tourist. Large amount of data can be composed from the Internet and travel guides, but these assets normally suggested personalized Point of Interest (POI) that is considered to be common, but the existing studies do not provide satisfactory information to the substance preference of the users or hold to their constraint. Unlike most existing travel recommendation approaches, the recommendation approach is not only personalized to user's travel interest but also able to suggest a travel sequence rather than personalized Points of Interest (POIs). Topical package space together with representative tag, the distributions of cost, visiting time and visiting season of each topic, is mined to connection the terms gap between user travel preference and travel routes. The proposed studies take advantage of the balancing of two kinds of social media; travelogue and community-contributed photograph. The proposed system map both user's and routes' textual description to the topical package space to get client/user topical package model and route topical package representation (i.e., source, destination, topical interest, cost, time and season). To suggest personalized POI sequence, first, well-known routes are rank according to the resemblance between user package and route package. Then top ranked routes are additional optimized by community similar users' travel records. In addition, the massive volume of information makes it a challenge for every tourist to pay notice to a potential set of POIs to make a visit in any unknown city. To sort out these problems, this research work expand this method to provide an author topic matrix modeling algorithm (ATMMA) is suggested for personalize tour. Hence, this method is highly explained here for tour recommendation problem based on similar user and similar city forecast, which considers user tags.**

Index Terms—**Travel recommendation, photo collection, social media, information retrieval.**

I. INTRODUCTION

Humans are different as far as our interests and abilities are concerned. It's not like, that everybody likes painting or everyone is fond of dancing, but yes, many of us have interests in common. People interests are according to what they like doing more, some people can analyze in a better way than others while others might just learn what they are supposed to learn as it is. In earlier days, while planning to go to a trip people used to ask their friends or family when they were not very much sure about what could be a improved plan, but still it was not very agreeable method, so in this era of internet, this research work came up with a better solution, Recommendation Systems.

There are two main challenges for automatic travel recommendation. First, the recommended POIs should be personalized to user interest since different users may prefer different types of POIs. Take New York City as an example. Some people may prefer cultural places like the Metropolitan Museum, while others may prefer the cityscape like the Central Park. Besides travel topical interest, other attributes including consumption capability (i.e., luxury, economy), preferred visiting season (i.e., summer, autumn) and preferred visiting time (i.e., morning, night) may also be helpful to provide personalized travel recommendation.

Second, it is important to recommend a sequential travel route (i.e., a sequence of POIs) rather than individual POI. It is far more difficult and time consuming for users to plan travel sequence than individual POIs. For example, it may still not be a good recommendation if all the POIs recommended for one day are in four corners of the city, even though the user may be interested in all the individual POIs.

Existing studies on travel recommendation mining famous travel POIs and routes are mainly from four kinds of big social media, GPS trajectory, check-in data geo-tags and blogs (travelogues). However, general travel route planning cannot well meet users' personal requirements. Personalized travel recommendation recommends the POIs and routes by mining user's travel records. The most famous method is location-based collaborative filtering (LCF). To LCF, similar social users are measured based on the location co-occurrence of previously visited POIs. Then POIs are ranked based on similar users' visiting records. However, existing studies haven't well solved the two challenges. For the first challenge, most of the travel recommendation works only focused on user topical interest mining but without considering other attributes like consumption capability. For the second challenge, existing studies focused more on famous route mining but without automatically mining user travel interest. It still remains a challenge for most existing works to provide both "personalized" and "sequential" travel package recommendation. To address the challenges mentioned above, this research work proposes a Topical Package Model (TPM) learning method to automatically

mine user travel interest from two social media, community-contributed photos and travel details. To address the first challenge, the proposed method regard as not only user's relevant interest but also the consumption capability and preference of visiting time and season. As it is not easy to straight measure the similarity between customer and direction, the proposed method construct a relevant pack up space, and plan both user's and route's textual descriptions to the topical package space to get user topical package model (user package) and route topical package model (route package) under topical package space.

The following contributions involved in the proposed system are:

- In this work proposes a personalized travel recommendation rather than a general suggestion. This work routinely mine user's travel interest from user contributed photo collections including expenditure capability, favored time and season which is significant to route planning and difficult to get directly.
- The proposed studies recommend personalized POI sequence rather than individual travel POIs. Well-known routes are ranked according to the similarity between user package and route pack up, and top rank well-known routes are further optimized according to social similar users' travel records.
- Topical Package Model (TPM) method to learn user's and route's travel attribute. It bridges the gap of user interest and routes attribute. The proposed works take benefit of the complementary of two big social media to construct topical package space.

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II. Literature Review

In this section, we mainly introduce five aspects of related works

1.H. Gao, J. Tang, X. Hu, and H. Liu, "Content-aware point of interest recommendation on location-based social networks," in Proceedings of 29th International Conference on AAAI. AAAI, 2015.

This paper presents the content information on LBSNs with respect to POI properties, user interests, and sentiment indications. Model the various types of information under a unified POI recommendation framework with the consideration of their relationship to check-in actions. The advantage is, user behavior, and demonstrates its power to improve POI recommendation performance on LBSNs. And the disadvantage is containing only small dataset.

2.Y. Shi, P. Serdyukov, A. Hanjalic, and M. Larson, "Personalized landmark recommendation based on geo-tags from photo sharing sites," ICWSM, vol. 11, pp. 622–625, 2011.

In this paper, the proposed method put forward a new research challenge on personalized landmark recommendation based on geo-tagged photos from users on photo sharing sites. The advantage is a novel category-regularized matrix factorization approach to recommend landmarks to individual users based on both user-landmark preference information and category- based landmark similarity.

3. S. Jiang, X. Qian, J. Shen, Y. Fu, and T. Mei, "Author topic model based collaborative filtering for personalized poi recommendation," IEEE Transactions on Multimedia, vol. 17, no. 6, pp. 907–918, 2015.

This paper explains author topic model-based collaborative filtering (ATCF) method for personalized travel recommendations. User's topic preference can be mined from the textual descriptions attached with his/her photos via author topic model. Through ATM, travel topics and a user's topic preference can be elicited simultaneously. The advantage is, without GPS records, similar users can still be mined accurately according to the similarity of user's topic preferences. The disadvantage is, in ATCF, POIs are ranked according to similar users, who share similar travel topic preferences, instead of raw GPS (geo-tag) data as is the case of most previous works.

4. Q. Yuan, G. Cong, and A. Sun, "Graph-based point-of-interest recommendation with geographical and temporal influences," in Proceedings of the 23rd ACM International Conference on Information and Knowledge Management. ACM, 2014, pp. 659–668.

In this paper, the focus on the problem of time-aware POI recommendation, which considers the temporal influence in user activities. This method proposes the GTAG to model the check-in behaviors of users and a graph-based preference propagation algorithm for POI recommendation on the GTAG. The proposed solutions exploit both the geographical and temporal influences in an integrated manner. The advantage has exploit both geographical and temporal impact in time-aware POI recommendation. The disadvantage is considering longer check-in process.

5. Y. Gao, J. Tang, R. Hong, Q. Dai, T. Chua, and R. Jain, "W2go: a travel guidance system by automatic landmark ranking," in Proceedings of the international conference on Multimedia. ACM, 2010, pp. 123–132.

In this system, a novel Automatic Landmark Ranking (ALR) method is proposed by utilizing the tag and geo-tag information of photos in Flickr and user knowledge from Yahoo Travel Guide. ALR selects the accepted tourist attractions (landmarks) based on not only the subjective opinion of the travel editors as is currently done on sites like WikiTravel and Yahoo Travel Guide, but also the ranking resulting from popularity among tourists. . The advantage utilizes geo-tag information to locate the positions of the tag-indicated places, and compute the possibility of a tag being a familiar sight name. For possible landmarks, impact factors are calculated from the regularity of tags, user records in Flickr, and user knowledge in Yahoo Travel Guidebook. The disadvantage provides hard to remove tags of events and activities from the landmark list.

III. Existing System

Automatic travel recommendation is an important problem in both research and industry. Big media, especially the flourish of social media (e.g., Facebook, Flick, Twitter etc.) offers great opportunities to address many challenging problems, for instance, GPS estimation and travel recommendation. Travelogue websites (e.g., www.igougo.com) offer rich descriptions about landmarks and traveling experience written by users. Furthermore,

community-contributed photos with metadata (e.g., tags, date taken, latitude etc.) on social media record users' daily life and travel experience. These data are not only useful for reliable POIs (points of interest) mining, travel routes mining, but give an opportunity to recommend personalized travel POIs and routes based on user's interest.

A. Disadvantages of Existing System

- The existing studies related to travel sequence recommendation did not well consider the popularity and personalization of travel routes at the same time.
- It is far most difficult and time observing for users to plan travel sequence than individual POIs.

However, general travel route planning cannot well meet users' personal requirements.

IV. PROPOSED SCHEME

To solve the problem of the existing system for travel recommendation, this paper proposed a personalized ranking travel recommendation system which could Automatic travel recommendation such as Topical package space, user package space and route package space. Big media, especially the flourish of social media (e.g., Facebook, Instagram, Flick, Twitter etc.) offers huge opportunity to address many difficult problems, for instance, GPS estimation and travel recommendation. Travelogue websites (e.g., www. indiatravelogue.com) offer well known descriptions about landmarks and traveling experience written by users. In addition, community-contributed photos with metadata (e.g., maps, tags, date taken, latitude etc.) on social media documentation users' daily life and travel experience. These data information are not only useful for consistent POIs (points of interest) mining, travel routes mining, but give an opportunity to recommend personalized travel POIs and routes based on user's interest.

In offline module, the topical package space is mined from social media combining travelogues and community contributed photos. Four travel distributions (i.e., topical interest, time, season and cost) of each topic are described in topical package space. The proposed method takes the advantage of the complementation of the three social media. For example, the "date taken" of Instagram, Facebook, twitter may be error with the influence of time difference. The proposed method observes that in community-contributed photo sometimes the "date taken" of night scene is daytime. But the time descriptions of POIs of travelogues do not have time difference problem. In offline module, what's more, the mine POIs and famous routes from community contributed photos, and obtain routes' packages through mapping travelogues, which are related to these routes, to the topical package space.

Online module focuses on mining user package and recommending personalized POI sequence based on user package. First, tags of user's photo set are mapped to topical package space to get user's topical interest distribution. It is difficult to get user's consumption capability directly from the textual descriptions of photos. But the topics user interested in could somehow reflect these attributes. For example, if a user usually takes part in luxurious activities like Golf and Spas, he is more likely to be rich. This work combines user topical interest and the cost, time, season distribution of each topic to mine user's consumption capability, preferred visiting time and season. After user package mining, the proposed method rank famous routes through measuring user package and routes package. At last, this work optimizes the top ranked routes through social similar users' travel records in this city. Social similar users are measured by the similarity of user packages. Following fig.1 shows the proposed system architecture for route recommendation.

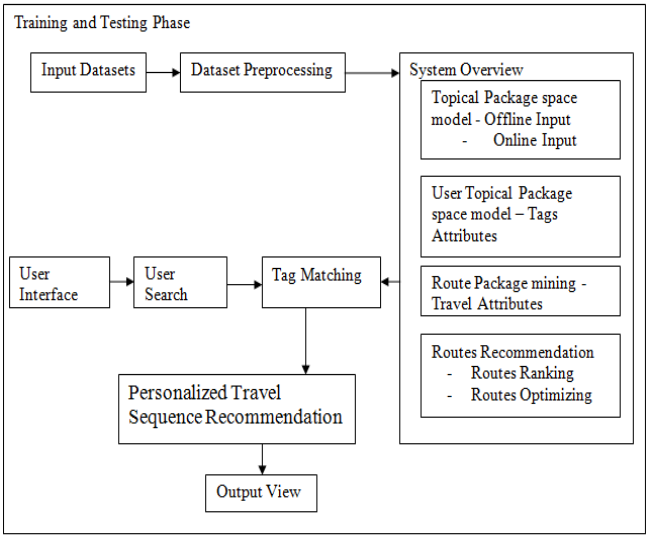

Fig.1 System architecture for route recommendation.

A. Modules

In this section, we briefly introduce the modules used in this paper:

- Topical package space,
- User package and
- Route package

Topic package space is a kind of space in which the four travel distributions of each topic are described by (1) representative tags mined from travelogues which describe POIs within the same topic; (2) the average consumer expenditure of the POIs within this topic, which are also mined from travelogues; (3) distribution of the visiting season of the twelve months mined by the "date taken" attached with the community-contributed photos; (4) distribution of visiting time during the day from travelogues. The usage of topic package space is to bridge the gap between user interest and the attribute of routes, since it is difficult to directly measure the similarity between user and travel sequence. From mapping both user information and route information to the same space, we get the quantitative standard to measure the similarity of user and routes.

User topical package model (user package) is learnt from mapping the tags of user's photos to topical package space. It contains user topical interest distribution, user consumption capability, preferred travel time distribution and preferred travel season distribution.

Route topical package model (route package) is learnt from mapping the travelogues related to the POIs on the route to topical package space. It contains route topical interest, route's cost distribution, route's time distribution and season distribution. To save the online computing time, we mine travel routes and the attribute of the routes offline. After mining POIs, to construct travel routes, we analyze the spatio-temporal structure of the POIs among travelers' records. First, we remove the users who only upload few photos or only take photos at one POI. Second, to each user, we construct the spatio-temporal structure of the POIs according to the "data taken". POI with the earlier timestamp is defined as the "in". POI with a later timestamp, on the contrary, is defined as "out". Then we count the times of "in" and "out" from POI to others by the records of all the users after filtering. A greedy algorithm is then applied to find the time sequence of these POIs. Thus, we finish famous routes mining and obtain famous routes of each city.

V. CONCLUSION

Automatic travel recommendation has been a focused theme in both the research and industry now-a-days. The flourish of social media addresses many challenging problems like automatic travel recommendation. Considering both the popularity and users travel preference at the same time, POIs and travel sequence are recommended. Based on the similarity between user package and route package, the famous routes are mined and ranked. Then according to social similar users travel report, the top ranked well-known routes are optimized. However, there are some limitations in the method. First, it could be hard to extract data from the travelogues due to large amount of data to be processed and it is difficult to get the precise visiting time only from the travelogues. Second, the current system did not include any transportation and hotel information. The proposed system can be enhanced by using larger server and can be implemented using larger data sets providing much dynamic plan without delay. In the future, this research work plan to investigate other possible ways to aggregate recommenders.

though a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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