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Customized Travel Recommendation System using Big Data Analytics

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Abstract

Traveling is a most important part of people lives. Travel based recommendation and journey scheduling are challenging tasks because of various interest favorites and trip limitations such as restriction of time, source and destination points for traveler's. The travel recommendation are used to extract a large amount of information from the social media. The existing work of travel recommendation has focused on personalized recommendation. Unlike most existing travel recommendation , our perspective is not only personalized to traveler interest but also gives the hotel recommendation for the visitors. The top K query algorithm is suggested for the hotels recommendation, also provides an optimized path in an efficient way. Hence, this method addresses the customized travel recommendation problem based on travel user and similar city forecasting. The top ranked routes are optimized and gives an efficient route to the travelers. Our work provides an efficient route prediction compared with the existing system

Keywords— Travel recommendation, Top k query algorithm, Topical package mining.

I. INTRODUCTION

Automatic travel recommendation is an important problem in both research study and engineering, especially with the growing of social media (e.g., LinkedIn, Flick, Digg etc.)using the big social media, it offers great opportunities to address many challenging problems, for instance, GPS estimation [1], [2] and travel recommendation [3]. Social media sites offer a representation about landmarks and traveling experience written by users. Furthermore, photos with metadata (e.g., time, date etc.) are taken from the social media dataset to analyze the user experience.There are two main challenges for automatic travel recommendation. First, the different user has different point of interest, and the system have to recommend according to the user experience. There are various types of POIs. Each has their own perspective, for example some people like zoo and some people like museum, hence the visitors have to prefer their own point of interest. Second, it has to recommend a sequential route plan. It takes more time for the user to plan the travel sequence rather than the individual interest. Each user have an own perspective and have a different point of interest and cannot visit the some places, even though the user may be interested in different places, due to improper scheduling suggested by recommendation system. In existing studies on travel recommendation mining, famous travel POIs and routes are divided into four kinds of big social media namely, GPS trajectory [5], check-in data [7], geo-tags [2], and blogs (travelogues) [11]. However, general travel route scheduling cannot well meet users' personal recommendation as it recommends the travel using the past user travel records.

The most famous method is location-based collaborative filtering (LCF),using the past history of the user experience from the social media. Then POIs are ranked based on similar users' visiting records. However, existing studies haven't well solved the two challenges. The first challenge being, focus on the travel recommendation, without considering additional attributes like cost, rate and season. The second challenge being, existing studies focused more on famous route mining and does not considering the user interest. It still remains a challenge for most existing works to provide both "personalized" and "sequential" travel package recommendation. A Top k query algorithm is used to automatically mine user travel interest from the social media, community-contributed photos and user experience. Compared with general routes recommendation, our personalized travel sequence POIs is more relevant to user's interest and more convenient for travel planning.

II. Related work

J. Bao, et.al., [2] learns the preferences of the users from location history, and models the preferred ideas with a weighted category hierarchy (WCH) and further approximately calculated the similarity between the two users' preferences by calculating the similarity of WCHs between the two users. This method adds to user preference modeling and manages the data sparseness problem for location recommendations.

D. M. Blei, et.al, [3] described latent Dirichlet allocation(LDA), a versatile generative probabilistic model for collecting discrete information. LDA is established on an easy exchangeability assumption for the various words and topics in a document. It is so accomplished by a straightforward application of de Finetti's illustration theorem. LDA is considered as a dimensionality reduction technique within the principle of LSI, however with proper basic generative probabilistic semantics that's logical for the kind of information that it models.

A. Cheng, et.al.,[4] focuses on the customized recommendation framework to provide not solely a context-aware recommendation system but also a route planning application before the journey is initiated. The personalization is achieved by adopting specific user profiles with the automatically detected people attributes (e.g., gender, age and race) along with the trips undertaken.

M. Clements,et.al., [5] predicts similar locations based on the users' geotag in a geographically remote location and view statistical enhancements over all users that visited largest cities and provides an example of efficient recommendation based on an artificial user profile and define a resemblance between the geotag distributions of two users based on a Gaussian kernel convolution. The geotags of most of the similar users are then combined to

relocate the popular locations in the destined city, personalized for this user.

H. Gao,et.al., [7] systematically studied the content information on LBSNs for POI recommendation and investigated various kinds of content data on LBSNs in terms of sentiment indications, user interests, and POI properties and model them below a unified POI recommendation framework.

As a result, the experiment demonstrated the importance of content data in explaining the user behaviour and improvement of POI recommendation performance on LBSNs.

Zheng, et.al., [12] has proposed to deploy the activity correlation and location correlation of the user with regard to the location features, to regularize the factorization of a location-activity matrix for location and activity recommendation. All these approaches target issues associated with the overall plan and optimization of travel guides by relying on the available resources of knowledge. In contrast, this work addresses a customized POI recommendation task. The recommendations are generated by the individual preference of every user.

III. PROPOSED WORK

The related work has some limitations over the existing methods. The existing systems only focused on POI recommendation of the travelers and did not include choice of hotel information. The proposed system extends the travel recommendation to the hotel recommendation using top k query algorithm. The top-K query algorithm process over uncertain data with the prediction technique to provide the hotel and transportation details which quickly converges to the real ordering of relevant results. It shows our proposed method reduces the computation time and also predict the result accurately**.**

In the proposed work, travel sequence recommendation system, could automatically mine user's travel attributes such as topical interest, consumption capacity and preferred time and season.

The System architecture tells about how the big data concept is applied on the Travel recommendation. When a customer enters into hotel Travel Package Recommendation System, the customer needs to give the information about the places. Based on this data, the process starts analyzing about the best hotels in the region as per the user preferences and the travel log, to display the best recommended packages on screen. The travel recommendation first part of the system divides the collected data into two types, one is user package and another is social user package. The social user package is the social media like flicker and amazon images. Based on these data, it finds the similarity calculation in the recommendation system.

After finding the similarity calculation, it will extract the user history, and divides the places into two types as famous and non-famous places, according to the user ratings. If the user rating is more it will be considered as the famous places. Users select the places according to their wishes.

It also suggest for famous hotels in that region based on the user preferences like cost per day, distance from the visiting places of interest, and the travel package amount. A travel package provides the best places and

recommends the best hotels near the cities and provides an optimized path in an efficient way.

A. Data collection and processin

In the data collection module the users have to collect the data from the dataset and review the travel recommendation according to it. Then using theMapper and Reducer concept it converts the unstructured data into the structured data. By using the collaborative filtering we collect the similar user rating from the users history and then split them into the highest count and least count to know the famous and non-famous places in that region.

B. Travel recommendation

In the travel recommendation it contains two social media such as amazon and flicker. It represent the visiting time and cost**.** It mainly concentrate on 4 major cities of the world called Barcelona Chicago pairs and New York, it takes the data record from the Barcelona dataset and recommends to the people who are visiting to the city.

C. Personalized travel plan

The list of user with their ranking details is maintained for the particular spot. Each and individual user route ranking are maintained. It allows the user to view the optimized path. This allows the user to comment about their experience and rank it based on their own interest or visited experience. Route Optimization algorithm is used for finding the shortest routes and displays different.

places to visit in that area and also provide a Google map for the user convenience.

Topical package mining: 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 users and routes.

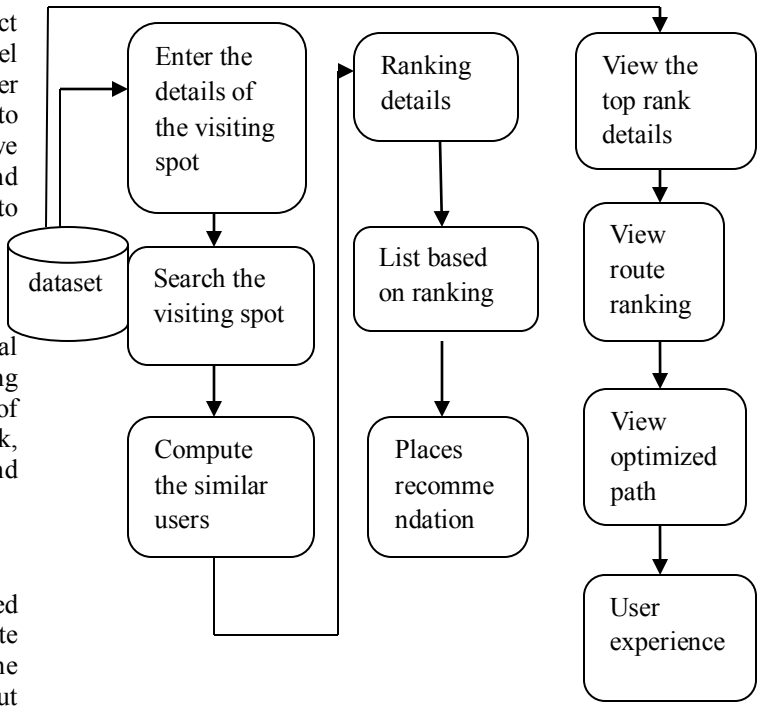

Figure 1.1 overall of system architecture

Routes package mining: Route topical package model (route package) is used for mapping the travelogues related to the POIs on the route to topical package space. Routes package mining module is concentrating on mining user's travel interest and recommending travel routes which contains two steps: 1) routes ranking, 2) routes optimizing

POI Ranking: We rank these routes according to the similarity between user package and routes package. Then POIs are ranked according to similar users' visiting records. The ranked set of routes is denoted as ^R. If the route meets user's interest, the score will be high, and it would be ranked at the top of the routes.

Route Optimizing: After POI and route ranking module, we get a set of ranked routes ^R. Figure Here, we further describe the optimization of top ranked routes according to social similar users' travel records. There are four POIs P1, P2, P3 and P4 on the famous route. First, we have to eliminate the POI with lowest popularity among similar users on this route. In P2 is the irrelevant POI and we delete it. Secondly, we select a list of POIs P5, P7 etc., which are most popular among social similar users' travel

records. P5, which is at the top of the list of POIs recommended by similar users, but not on the famous route should be considered to be added on the route. We calculate each distance after adding P5 at a different place. We addP5 between P1 and P3, since the extra distance of adding P5between P1 and P3 is shorter than extra distance of addingP5 between P3 and P4.Then we should consider whether the POI is on the way for both space and time. The calculation of the time distribution gets the new route.

Top K Query Processing: Travel recommendation system is used to predict the hotels in a nearby city. Top K Query Processing algorithm is used to find the top three best hotels. Each tuple in this relation has a number of attributes, including *timing*, *Rating*, and *Price*, which are handle by self-sufficient web Databases. A user will give the suggestions about the services and the hotels gives the details about the places. This provides a list of the top 3 restaurants that match the user's specification the closest. After providing the top 3 hotels the visitors can select a places which is suitable for their accommodation and then it provides the optimized path in an efficient way

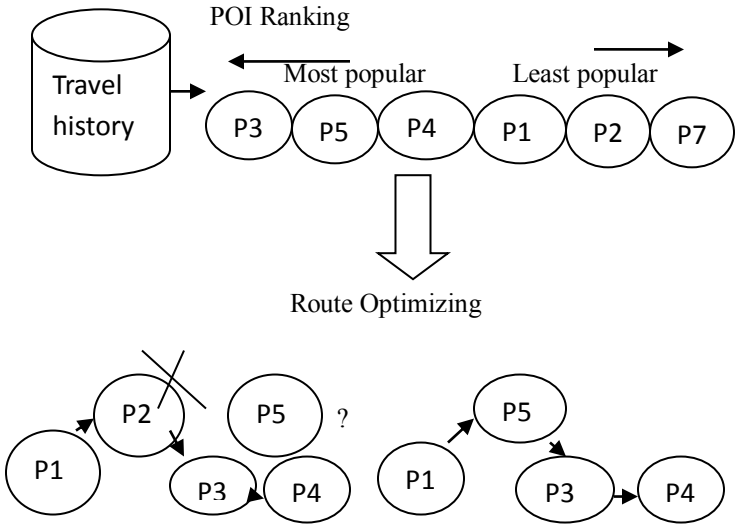

Figure 1.2 Flow of Route Optimizing

IV. EXPERIMENATAL RESULTS

This experiment shows an structure for the evaluation, in which we respectively explore the efficiency of the location and the travel sequence recommendation by performing the user experience. In this study, .NET based application has been used and travel sequences recommendation is based on top k query process approach is used, including our methods and some baselines. For travel based recommendation system , Barcelona dataset is used as the input and it will process the data according to the traveler preferences it takes the opening and closing time as the major issues in existing system so we going to recommend the travelers . A query is taken as input and similar user history with their tagged information are displayed as output.

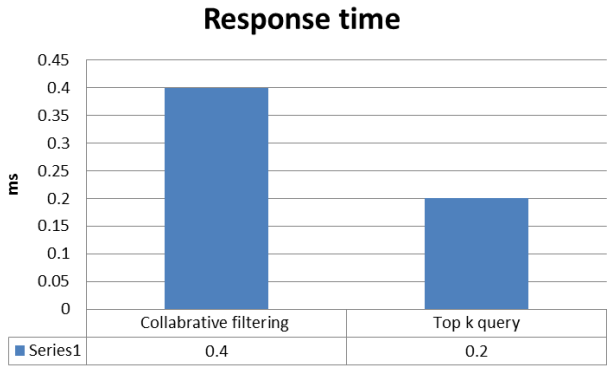

Figure 1.3 Response Time

V . CONCLUSION

In this paper, using the Barcelona dataset generated by multiple users, we mined interesting locations and classical travel sequences within a given geospatial region. The advantages of our work is the system automatically mined user's and routes' travel topical preferences including the cost, time and season, These enable travel recommendation as well as mobile recommendation also. In this work, we consider an individual's visit to a location as a link from the individual to the location. A top k query model is proposed to recommend the nearby hotels according to the user preferences and provides an optimized path in an efficient way.

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