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Paper Authors

[1]**D.PRIYANKA,**

[2]**S.KRISHNA REDDY**

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EFFICIENT KEYWORD-AWARE REPRESENTATIVE TRAVEL ROUTE FRAMEWORK

[1]D.PRIYANKA, [2]S.KRISHNA REDDY

[1]Mtech student, SreeDattha Institute of Engineering and Science

[2]Professor, SreeDattha Institute of Engineering and Science

ABSTRACT

With the popularity of social media (e.g,Facebook and Flicker), users can easily share their checkin records and photos during their trips. In view of the huge number of user historical mobility records in social media, we aim to discover travel experiences to facilitate trip planning. When planning a trip, users always have specific preferences regarding their trips. Instead of restricting users to limited query options such as locations, activities, or time periods, we consider arbitrary text descriptions as keywords about personalized requirements.

1. INTRODUCTION

Location-based social network (LBSN) services allow users to perform check-in and share their check-in data with their friends. In particular, when a user is traveling, the check-in data are in fact a travel route with some photos and tag information. As a result, a massive number of routes are generated, which play an essential role in many well-established research areas, such as mobility prediction, urban planning and traffic management. In this paper, we focus on trip planning and intend to discover travel experiences from shared data in location-based social networks. To facilitate trip planning, the prior works in provide an interface in which a user could submit the query region and the total travel time. In contrast, we consider a scenario where users specify their preferences with keywords. For example, when planning a trip in Sydney, one would have "Opera House". As such, we extend the input of trip planning by exploring possible keywords issued by users.

Data mining consists of five major elements:

1) Extract, transform, and load transaction data onto the data warehouse system.

2) Store and manage the data in a multidimensional database system.

3) Provide data access to business analysts and information technology professionals.

4) Analyze the data by application software.

5) Present the data in a useful format, such as a graph or table.

In this paper, we propose an efficient Keyword- aware Representative Travel Route framework that uses knowledge extraction from users' historical mobility records and social interactions. We have designed a keyword extraction module to classify the POI-related tags, for effective

matching with query keywords. We have further designed a route reconstruction algorithm to construct route candidates that fulfil the requirements. To provide befitting query results, we explore Representative Skyline concepts, that is, the Skyline routes which best describe the trade-offs among different POI features.

Even though there are numerous tourism websites and travel agencies to provide various travel packages, tourists just become puzzled about how to make a choice and neither could they adjust the travel plan. Besides, if tourists try toarrange the travel route by themselves, tremendous information is easy to exhaust them when considering the location interest, visiting time, price, etc. So it is desirable if a travel recommender could help a tourist to find places matching his interests. Location based social network (LBSN)services allow users to perform check in and share their check in data with their friends.In particular, when a user is traveling, the check-in data are in fact a travel route with some photos and tag information. As a result, a massive number of routes are generated,which play an essential role in many well-established research areas, such as mobilityprediction, urban planning and traffic management. However, the query results ofexisting travel route recommendation services usually rank the routes simply by the popularity or the number of uploads of routes. With the rapid development of location based social networking services, e.g. Loopt, Brightkite, Foursquare have emerged in recent years. These LBSNs allow users to establish cyber links to their friends or other users, and share tips and experiences of their visits to plentiful places-of-interests (POIs), e.g. restaurants, stores, cinema theaters, etc. Users and POIs are two essential types of entities in LBSNs.

2. PROBLEM DEFINITION

Even if there are plentiful websites and companies to provide various plans for the arrangement of trips, traveller just becomes clueless about how to choose and fix the travel plan. If the person attempts to sort the travel route by themselves, they find difficulties as below:

- Sometimes travel agencies provide plans, which are not matched to users' need.
- Often packages are too expensive, which is not economical to tourist.
- Usually, travel agencies reassuring worthy service to tourist, but that does not occur indeed.

In this paper, we proposed a scheme that could help a traveler to find places corresponding his/her interests. The basic logic of this idea is that users' desire can be derived bother users who exhibit similar visiting behavior's to POIs in previous check-in activities.

GOALS

- To provide befitting query results, association mining concept have used.
- To evaluate the effectiveness and efficiency of the algorithms, proposed system have conducted experiments on location-based social network datasets.

- Wehave designed a keyword extraction module to classify the

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POI-related tags, for effective matching with query keywords.

ALGORITHMS

Candidate Route Generation

In the previous sections, we have proposed the methods for matching raw texts to POI features and mining preference patterns in existing travel routes. However, the route dataset sometimes may not include all the query criteria, and may have bad connections to the query keywords. Thus, we propose the Candidate Route Generation algorithm to combine different routes to increase the amount and diversity. The new candidate routes are constructed by combining the subsequences of trajectories. Here we introduce the preprocessing method first. We then utilize the pre-processing results to accelerate the proposed route reconstruction algorithm. Last, we design a Depth-first search-based procedure to generate possible routes.

Algorithm 1. Candidate Route Generation

Input: Raw trajectory set T;
Output: New candidate trajectory set T_c.

```
Initialize a stack S;
Split each route r ∈ T into (head,tail) subsequences;
Reconstruct(headSet).
Procedure Reconstruct(Set):
foreach (head,tail) ∈ Set do
    endFlag = False;
    if S is empty or tail.time > S.pop().time then
        Push head in S;
        Push tail in S;
    else
        Push head in S;
        endFlag = True;
    if endFlag is False then
        Reconstruct(tailSet)
    Insert S in T_c;
Procedure End
```

Travel routes exploration

With the featured trajectory dataset, our final goal is to recommend a set of travel routes that connect to all or partial user-specific keywords. We first explain the matching function to process the user query. Next, we introduce the background of why we apply a skyline query, which is suitable for the travel route recommendation applications, and present the algorithm of the distance-based representative skyline search for the online recommendation system. Furthermore, an approximate algorithm is required to speed up the realtime skyline query.

Algorithm 2. Travel Routes Exploration

Input: User u, query range Q, a set of keywords K;
Output: Keyword-aware travel routes with diversity in goodness domains KRT.

```
Initialize priority queue CR, KRT;
Scan the database once to find all candidate routes covered by region Q;
/* Fetch POI scores and check keyword matching
foreach route r found do
    r.kmatch ← 0;
    foreach POI p ∈ r do
        r.kmatch ← r.kmatch + KM(p,k);
    if r.kmatch ≤ ε then
        Push r into CR;
/* Initialize an arbitrary skyline route, see Section 4.3
CR.r_0 ← route r with the largest value of an arbitrary dimension;
/* Greedy algorithm for representative skyline, see Algorithm 3 */
KRT ← I-greedy(CR);
return KRT.
```

RESULTS

The system is implemented using Java which is both a programming language and a platform. It is a web application which has

user module and admin module. Admin has the privilege to add new places after logging into the application. He also has the privilege to see the user details, places and place details. The user can login to the system and provide his source and destination place. Application provides the user with the places he can visit on the way from source to destination. User can also have information about the place, location, category, season, and map.

3. PROBLEM SOLUTION

PROPOSED SYSTEM

We develop a Keyword-aware Representative Travel Route (KRTR) framework to retrieve several recommended routes where keyword means the personalized requirements that users have for the trip. The route dataset could be built from the collection of low-sampling check-in records. We argue that knowing semantics is important, as some query keywords do not need to be matched in the POI keyword. This paper builds on and significantly improves the KSTR framework of recommending a diverse set of travel routes based on several score features mined from social media. KSTR then constructs travel routes from different route segments. We propose a KRTR framework in which users are able to issue a set of keywords and a query region, and for which query results contain diverse trip routes. We propose a route reconstruction method to partition routes into segments by considering spatial and temporal features. Representative Skyline query for travel route search is adopted to combine the multi- dimensional measurements of routes.

The proposed system has four modules say
(1)Travel Routes Exploration

(2) Keyword Extraction

(3) Feature Scoring Methods

(4) Route Recommendation.

4. CONCLUSION

In this paper, we study the travel route recommendation problem. We have developed a KRTR framework to suggest travel routes with a specific range and a set of user preference keywords. These travel routes are related to all or partial user preference keywords, and are recommended based on (i) the attractiveness of the POIs it passes, (ii) visiting the POIs at their corresponding proper arrival times, and (iii) the routes generated by influential users. We propose a novel keyword extraction module to identify the semantic meaning and match the measurement of routes, and have designed a route reconstruction algorithm to aggregate route segments into travel routes in accordance with query range and time period. We leverage score functions for the three aforementioned features and adapt the representative Skyline search instead of the traditional top-k recommendation system. The experiment results demonstrate that KRTR is able to retrieve travel routes that are interesting for users, and outperforms the baseline algorithms in terms of effectiveness and efficiency. Due to the real-time requirements for online systems, we aim to reduce the computation cost by recording repeated queries and to learn the approximate parameters automatically in the future.

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