Location Guidance

Find a Way by using POI Recommendations

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Abstract *— Point-of-Interest recommendation is an essential means to help people to discover an attractive locations, especially when people travel out of town or to unfamiliar regions.*

While a growing line of research has focused on modelling user geographical preferences for POI recommendation, they ignore the phenomenon of user interest drift across geographical regions, i.e., users tend to have different interests when they travel in different regions, So we propose a latent class probabilistic generative model Spatial-Temporal LDA (ST-LDA) to learn region-dependent personal interests according to the contents of their checked-in POIs at each region. In another concept called LBSNs (Location Based Social Network), users can post their physical locations in the form of "check-in", and share their life experiences in the physical world. It is crucial to utilize user check-in data to make personalized POI recommendation in LBSNs, which helps users know new POIs and explore new regions (e.g., cities),and POI approaches for user to make the travel package plans to travel a city , find the places between the source and destination and find the places according to user privileges.

***Keywords*— Location-based social networks (LBSNs), point-of-interest (POI), types of recommendation, location recommendation, area recommendation, travel route recommendation,travel package recommendation, travel route planning (TRP) algorithm.**

I. Introduction

Point-of-Interest recommendation is an essential means to help people discover attractive locations, especially when people travel out of town or to unfamiliar regions.

When people visit different places they can upload the photos of visited locations, post their comments, share their experiences with heir friends, share their location via check-in using this application. This check-in information is used for point of interests like historical places, temples, restaurants etc. This task of recommending unexplored new places is referred to as Point of Interest (POI).

POI recommender system considers frequency of check-in data at a particular location, social friends interest. Generally POI is recommended in majority of cases based on check-in information which is obtained when users share their location using this application. Recommendation is done taking into consideration user preferences extracted from location based service such as at which time user visit which location and travelling interest.

Crowdness is calculated based on the user's check-in information. Crowdness calculation will help the people to know about the places, whether the place is crowded or not. For the crowdness to be calculated the users must use the application and check-in to the particular location. Based on the network used by user crowd-ness will be calculated.

Fig1: How to discover new locations.

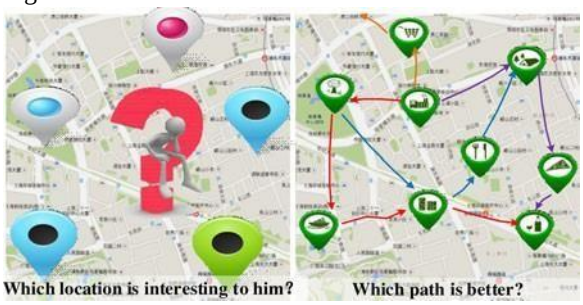

Fig 2: Two major challenges for personalized travel recommendation.

There are two major challenges (see Fig. 2). The first is dynamically obtaining user's travel preference. User study is a conventional investigation strategy, but it is not scalable for a large number of users. It also cannot reflect the transfer of travelers preferences, unless a survey is periodically conducted, which is infeasible. The wide use of LBSNs results in the possibility of leveraging the crowd sourced data generated to obtain user preferences. The second one is that POIs in a travel package are constrained by physical conditions and are interrelated with each other. In contrast with single POI recommendations, recommendation of multi-POIs is more likely to be a constrained optimization problem. The selection and order of POIs are determined by a set of factors, including user preference to POIs, distance between POIs.

The main contributions of this study are as follows.

1) *User profiling and location modeling based on LBSNs:* The check-in behavior of LBSNs indicates the actual visit of locations, while traditional online behaviors, like web search or browsing, do not. Therefore, the spatiotemporal trajectories from LBSNs can be regarded as the actual connections between users and locations. Thus, we propose constructing the user profile and location model based on crowdsourced check-in records.
2) *Generating modules with respect to POI recommendation:*

Search location
Place near me
Plan city ravel
Find places between source and destination.
History
Location alarm
Point-of interest

Search location: Locations are added to the database by administrator. The user can select the places from location list and should enter the current location. The application will route the best path from current location to the selected location.

Place near me: the user's current location is fetched and near- by privileges are shown on the map within the radius of 3 kms. For example if the user selects ATM privilege, all ATMs within the specified radius will be shown the map with markers on it. When particular ATM is selected its name and address will displayed.

Privileges can be ATMs, Hospitals, Hotels, Temples and so on.

Plan city travel: The user enters city name, start time and end time. The list of locations that can be visited in the entered location will be shown. The user selects the places. For selected places priorities will be assigned and best route is calculated.

Find places between source and destination: the user here enters the source name and destination name. The places between specified source and destination will be listed. User can select his/her interested places. Map of selected places will be generated. On the way to trip privileges are shown. Trip is planned on a timely manner. Review of any places can be checked.

History: history module will contain the information about the places previously visited by the user. This helps him / her to know or visit the same place again.

Location alarm: Alarms can be set when particular place/location is reached by the user. It is user's interest to set alarm to any particular location.

Point-of-interest: places listed according to the point-of-interest of the user.

3) *System prototyping and performance evaluation:* We implemented a prototype system with a mobile client and a recommendation server. We conducted a trace-driven simulation to evaluate system performance. Results suggest that the proposed approach can improve the recommendation accuracy with moderate

II. Related Work

There is lot of study conducted on the travel package recommendation over spatial data and check in history.

Zhiwen u et.al [1] proposes a system that predict locations as per user's interest and generate travel package. User's preference changes with time and hence is dynamically extracted from LBSN .Thus user profiles are continuously updated. Location popularity is considered and rating is also given importance. Package recommendation consist of sequence of POIs useful for travel planning. First the system finds POIs which are near to current location of the user. Then it calculates preferences for these new POIs depending on what user likes based on information obtained from user profile. This process is repeated for different time slots. Thus the system determine route to take and the travel package.

H. Yin et. al[2] uses Spatial –Temporal LDA model to recommend POIs at each region which are region dependent and according to user interest as well. It uses the fact that users tend to have different interest when they travel to different i.e. out of town regions. Check-in records of local users is mined to learn local crowd preferences. Check-in records from outsiders will be used to learn tourist preferences. Also an algorithm is developed to speed up the recommendation process. Daily activity done at different time is also considered.

Jihang Ye[3] try to predict most likely category of user activity to be done next using check-in category information. By using mixed hidden Markov model this prediction is done. Category level modeling reduces the huge prediction space which is result of millions of check in information. The system addresses the problem as two sub-problems viz. predicting category of user activity at next step and predicting location depending on category distribution.

X.Lu [4] propose a system which predicts sequence of travel routes to be taken using geotagged photos .These geotagged photos uploaded by various people are the aggregated to recover possible travel routes. Also user choice like duration and visiting time and destination type preferences etc are considered.

H.Yin et. al[5] proposes recommender system that recommend a set of locations and event by considering both individual user's interest and as well as preferences of local crowd . Helps the user while visiting unknown places. Offline module captures co-occurrence patterns and exploits Item contents. Online module takes user query to predict top recommendations for POIs but taking into consideration the interest of tourist and local crowd. It uses threshold algorithm for speeding up online process. It integrates collaborative and content into a probabilistic generative model.

Yonghong Yu et. al [6] surveys POIs recommendation in LBSN. It finds that POI recommendation uses Tobbler's Law that "everything is related to everything else but near things are more related than distant things". This means that people prefer to visit nearby location w.r.t. their current locations. User's preferences are reflected through check- in frequency for locations. Lots of Check-in information creates sparsity problem for POI recommendation. It shown by Ye, Yin in their study that social influence has limited contribution on user's check-in behaviour. It identifies 4 categories of POIs viz. pure check-in , geographical influence enhanced POI ,social influence enhanced POI and temporal influence enhanced POI .The survey concludes that although all kinds of information is used, still check-in data, geographical influence and temporal influence have significant impact on recommendation quality.

Yin et.al [7] proposes to use probabilistic model named TRM for prediction of POIs taking into consideration semantic, temporal and spatial patterns of user's check-in activities. It is used for home town as well as unknown new place recommendation. The proposed system can effectively solve sparsity and cold start problems .Semantic patterns minimizes the effect of data sparsity when analyzing unknown place recommendation and temporal patterns are used in hometown recommendation. Its limitation is it assumes user's interest are stable across geographical regions.

Zhiwen Yu et. al [8] proposes a system that recommend a travel package by making use of crowd sourced data from LBSNs. Considering user choice of places to visit , it mines the check in records to find peculiar points of interest (POIs) characteristics. Constraints such as travel season, time period and starting location are also considered while recommending the travel package.

Qi Liu et. al[9] built a system based on the characteristics of existing travel packages. The topic extraction is done considering the constraints like locations, seasons, tourist. These topics are then used for personalized travel package recommendation. The model is modified by mining patterns that exist in relationships among tourists in each group. Through experiments it is proved that the proposed model identify the features of the travel data which helps in more proper recommendation for travel packages.

Chen Cheng et. al[10] propose to find successive personalized POI recommendation in LBSNs. Two prominent properties in the check-in sequence: personalized Markov chain and region localization are used for this purpose. This system does not consider the temporal relations.

Gregory Ference et. al[11] proposes location recommendation system for out of town users by making use of user preference, social friend's influence and geographical closeness to the current location. It uses the fact that similar users will like similar places .This fact is used for in-town users while recommendation is made for out of town users based more importantly on social influence

Bo Hu et. al[12] proposes a system model capturing both the social interaction and topic aspects of user check-ins. It explores areas of social network-based recommender systems. Based on friends' interests and their check-in behavior, location recommendation is made.

Yan-Ying Chen et. al[13] propose to conduct personalized travel recommendation not only by using community contributed geo tagged photos but also specific user attributes like age, gender , cultural background, profession etc. and type of people travelling with like family, friends, couple etc. Personalized recommendation is made with respect to user's interest and attributes.

III. Proposed Work

System architecture:

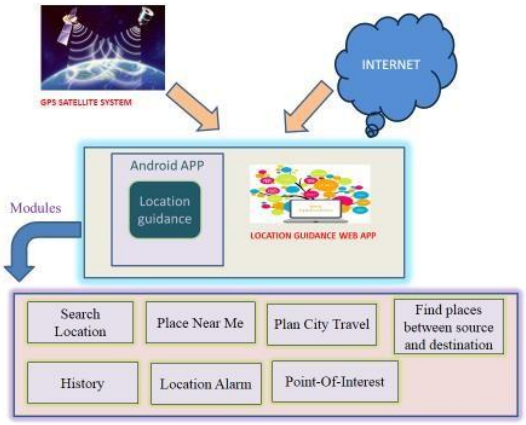

Fig3: system architecture

We aim to build a location guidance for user to find places according to the poit-of-interest of the user to the places in travelling.

The above figure(fig3) shows the requirement components for the system .GPS satellite system provides an goggle map ,internet provides the goggle API's and online map facilities, web application is used by admin and mobile application and its modules are listed out.

FLOWCHART:

The figure (fig4) shows the flow of the main modules of the location guidance system.

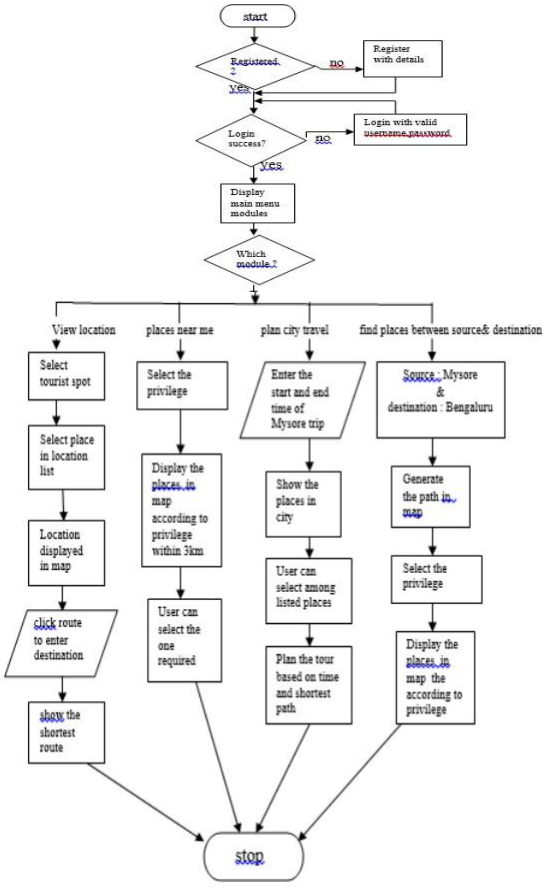

Fig4:flowchart for location guidance application.

Conclusion and Future Enhancement

1. We can find the location according to point of interest of the user.
2. We can plan the city travel according to user timing and his interest and places availability.
3. We did location search for district wise for states, find the places according to privileges beet win source –Mysore and destination –Bengaluru.
4. We can save the location and set the alarm for that location, we can share the reviews of a physical location by check in to that place.
5. We can discover the new locations.
6. We can save the check-in location to history of the user.

Future enhancement:

1. Improve the crowd-ness calculation for a region by using artificial intelligence
2. Increase the places list in location search.
3. Find the places between any source and any destination.
4. Share the images in review share for the location.

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