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Travel Route and Hotel Recommendation

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Abstract: In this era of world wide web, a huge amount of information is overloaded to users over the internet. It becomes a burdensome task for the users to get the significant results of their query. Although, to some extent, this problem is solved by the search engines, but again they don't provide the personalization of data according to every user. The Recommender Systems are software tools and techniques providing suggestions for items for a user as solution to the overload and personalized information problem. Recommender systems are like information filtering systems that explores to predict the user preference by taking some information from user as their interests. This paper focuses on their application in tourism. It focuses on recommendation techniques for the whole travel route and hotel recommendation package.
Keywords: Recommendation system, Clustering, Travel package, Hotel recommendation, Distance based algorithm, Places of interests.

I. INTRODUCTION

Recommendation System is an Information retrieval technology that improves results, access and proactively recommends relevant information to users by taking into context user's explicitly mentioned preferences and object behaviours. In this paper, we focus on the Travel route and hotel recommendation system that helps user to narrow down the set of choices, explore the set of options, find the appropriate place according to their activities of interests like trekking, sight-seeing, etc., find the things that are more interesting to users, find the best hotels available at those particular places and discover the new things. To facilitate trip planning, this system provides an interface in which user specifies their preferences by filling information like starting point of travelling, total budget of travelling, activities of interests, number of people travelling. The system provides the best nearby places to the user mentioned starting point and the hotels available in their budget of trip according to their activities of interest, everything under their budget of travelling.

In this paper, we develop this Travel route and Hotel recommendation system to display several travel routes and hotels as per the personalized requirements that users have for the trip. Although there are many such type of recommendation systems but this system provides all the facilities such as all the nearby places to the user mentioned region of interest, best hotels in users' budget, places according to the activities of interest, download facility for the places and hotels recommended so that user does not have to get online again and again to find their travel routes and hotels, and the route of travelling with directions using google API all at one place.

II. BACKGROUND OR RELATED WORK

The information is growing too rapidly in a large scale than our processing ability. People are surrounded by the various sources of information like books, conferences, web pages that release every day, number of new articles and journals. Recommender systems is one of the sub category of information filtering system which deals with the information overloaded by the number of suggesting users of their own interest. The preferences and the ratings are predicted by the recommender system that a user would give to an item or a thing [1].

A. Time Aware Routes

With the increasing popularity of location sensing technologies like mobile devices, location-based social networks (LBSNs) have influenced lots of users to share information such as already visited places, travel experience and reviews or ratings. By continuously storing the record of such kinds of user's information, a large-scale of user's check-in data based on past records are generated in LBSNs, which implicitly reveals how people travel at certain area with temporal information, including longitude and latitude. By using user's history check-in data, one can easily explore user's preferences and can generate a route with the location [2]. The services like LOCATION-BASED social network (LBSN) allow users to perform check-in data and share their data with their friends and among people. Whenever a user is traveling, and shares the information like photos and tagging the location it actually generate a travel route at that time and this results into generation of massive number of routes, which plays an vital role in many research areas such as mobility prediction, urban planning and traffic management. With the help of generated massive routes the user can choose a shortest route and with less traffic, so the time can be consumed [3].

B. Travel Recommendation

The Travel & Tourism has become one of the rapidly growing world's largest industries. With the advancement of time everyone in the world started traveling comfortably on a less budget. Nowadays more and more travel companies provide online services like different packages to satisfy the user's personalized requirements [4]. Recommender system successfully plays an important role to enhance the quality of service for users in the various fields. Recommender systems solves many problems of user's like traffic management, pre-information about the place. This system let the user know whether to select the place for travel or not.

C. Best Hotels Recommendation

Generally, in looking for a hotel, users use the hotel reservation sites. Users decide their hotels based on information such as hotel website, reviews, rates and evaluation ratings by review contributors for each hotel. In each hotel reservation site, the recommender system selects hotels which satisfy the conditions of the user such as the accommodation preferred by the user with its budget. As a result list of selected hotels is often displayed based on a there rankings. Hotel Recommendation system displays hotels list according o the users budget and review. To this end, the system automatically extracts the preferences of the users from their reviews [5].

III. PROPOSED METHODOLOGY AND DISCUSSION

As given in introduction our system provides recommendation to users according to his/her point of interest, hotel budget, nearest hotels and many more. For solving this problem we proposed the methodology like collaborative filtering. Proposed system includes different algorithm like k-means and knn algorithm both the algorithms are used in recommendation system.k-means is used in recommending similar type of places which is in users are interested . knn algorithm provides recommendation on the nearest hotels to the recommended places .

A. Means Algorithm for recommending places

k-means is the clustering algorithm used in finding similar type of places like which are given by users point of interest . in this system it is used in recommendation of places according to the clustering. it divides data sets into different clusters and then find the centroid of the each and every cluster. it is basically works on clustering and finding mean .it provides simple algorithmic steps for clustering which are following :

Algorithmic steps for the k means algorithm

step 1: classification of given datasets in clusters.

step 2: selects initial centroids as k from each cluster.

step 3: repeat step of centroid calculation using following formula.

$$J(V) = \sum_{i=1}^{c} \sum_{j=1}^{c_i} \left(\left\| x_i - v_j \right\| \right)^2$$

step 4: recompute the centroids of each and every cluster .

step 5: until centroids remains same.

  In the algorithm initial centroids are chose randomly. Centroids are nothing but the means of the different clusters. This is used to solve the clustering problem which results in providing a places which are similar type as historical places, hill stations, temples etc.

B. KNN Algorithm for finding nearest neighbour

In our proposed system KNN algorithm is used for finding nearest neighbour using distance metrics. Like it is used in the finding the nearest hotels to the recommended places so that user can easily chose the nearest hotel for staying. and also using this algorithm no of nearest hotels are recommended to the users then they can choose the hotels which are near to visiting places as well as that hotels are in users budgets. so our system asks users the distance or area under the places for visiting. Like if user wants to visit places in range of 76 Km in the any particular area then system provides visiting places list in that area as well as nearest hotels in budget.

Knn algorithm is used in finding the nearest neighbour using distance relationship formula.in this it requires no of calculation in finding the hotels in particular range. Let's see the knn algorithm working. consider that we have the nearest number as K .and we want to find the minimum distance between two points so our problem is solve using knn algorithm .this algorithm uses Euclidean Distance to find the nearest neighbour using the following formula.

EuclideanDistance(x, xi) = sqrt(sum((xj – xij)^2))

Algorithmic steps for the knn algorithm

step 1 : find parameter K = no of nearest neighbours.

step 2 : calculate the distance between the given query and datasets sample.

step 3 : sort the distance according to minimum to maximum.

step 4 : determine the nearest neighbours according to the k's minimum distance.

step 5 : gather the category of that nearest neighbours .

step 6 : use similar category of nearest neighbours for as prediction value of query.

so using above algorithm we can easily find the nearest hotels and recommend the users according to his requirements given and he/she easily get the all the recommendation of hotels which are near to the places recommended by the k-means algorithm.

IV. MATHEMATICAL MODEL

Let 'S' be the system

Where

S= {I, O, P}

Where,

I = Set of input (information related to user interest)

O = Set of output (recommended places along with information)

P = Set of processes involved

I = {({types of places, activity}, budget, start date, distance, number of vacation days, number of people), travel options}

P = {P0, P1, P3, P4)

P0 = Searching places P with {{types of places, activity}, travelling season} using k-means algorithm.

P1 = Filter places from k where distance < user defined distance using knn algorithm

P2 = Select the places from K where, travelling cost+ staying cost+ activity cost< user defined budget

P3= Searching route recommended mid station for source, destination, and type of interest

R = {r1, r2 …., rn}

Where, each r is the recommended route for matching mid stations with user defined type of interest. Using candidate generation algorithm.

Places < area distance

Rp = Resultant Places

Distant from source to Rp < distance mention by user.

O = {K, R, Places, Activity, Hotel, Travelling option, nearby attraction, distance, rating}
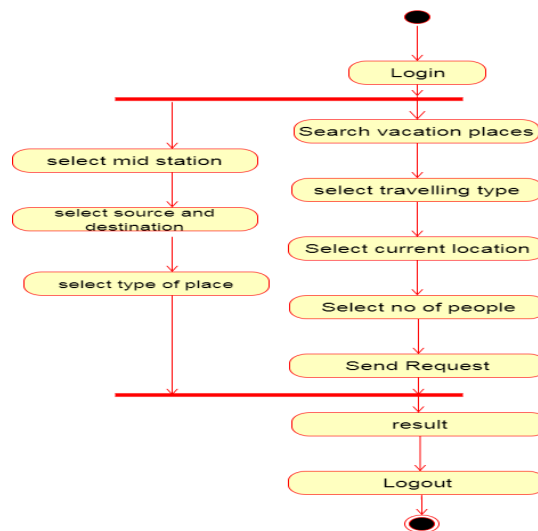

Fig. 1 Activity Diagram of Proposed System

V. CONCLUSIONS

The travel routes are related to user's preference keywords, and are recommendation based on the attractiveness of the point of interest it passes, visiting the point of interest at their corresponding proper arrival times and the routes generated according to the users check in data and information provided by the users. The novel keyword extraction module is used to identify the semantic meaning and match the measurement of routes. Algorithms are used to aggregate route segments into travel routes in accordance with query range and time period.

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