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A Survey on Venue Recommendation System

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ABSTRACT: With abundance of options available for users these days' recommendation systems are of great importance. Recommending venues is a crucial task as the venue needs to fulfil the user's expectation. Considering multiple factors in order to recommend the most appropriate venue is prime objective for a VRS. Constant improvement in venue recommendation systems is a need of the hour. Which in turn requires us to survey the various recommendation methods used in VRS and find out ways to improve the recommendation by further refining the method and including other factors which would make the recommendations more accurate and precise.

KEYWORDS: Venue recommendation system, Opinion target and word extraction, reviews, venue closeness.

I. INTRODUCTION

Due to rapid growth of the internet and easy accessibility of large number of e-commerce and social network services (for e.g. Flipkart, Amazon) large amount of data has been collected by the provider on daily basis. This continuous accumulation of large amount of data has created the challenge, that how to retrieve the pertinent information i.e. the information which is more relevant to user's query. This need leads to designing of more intelligent information retrieval system which is called as Recommendation Systems. Recommendation Systems has become an essential component of e-business applications.

Consider the example of Flipkart, Amazon etc. which provides recommendation of Items, according to user's interest. Recommendation systems can be broadly categorized into two types (a) Content-based Recommender Systems and (b) Collaborative filtering based Recommender Systems. Content-based systems analyses properties of the items recommended. For example, if a Netflix user has watched many comedy movies, then recommend a movie classified in the database as having the "comedy" genre. Collaborative filtering systems recommend items based on similarity measures between users and/or items. The items recommended to a user are those preferred by similar users. Breese et al. [9] described CF algorithms as separable into two classes: memory based algorithms that require all ratings, items, and users be stored in memory and model-based algorithms that periodically create a summary of ratings patterns offline. Pure memory-based models do not scale well for real-world application.

Recommendation systems can be used to recommend venues to the user which are called as Venue-based Recommendation system (VRS). Recommendation systems have been introduced in Venue Recommendation Systems (VRS) allowing users to get appropriate recommendations according to their preferences. Many web application services provide "check-in" facility to user [2]-[3]. Due to such large number of check-ins, large amount of data has been collected on daily basis. Based on this data stored by such services, various Venue Recommendation Systems were deployed [2]-[4]. Collaborative Filtering is widely used in Recommendation systems.CF-based based approaches such as memory based and model based are widely used in venue recommendation systems to provide recommendations. However, there is a challenge in front of existing venue recommendation systems is how to process large amount of data and how to extract preferred venues according to user's interest [2]- [4]. Existing venue Recommendation system uses real time contextual information, such as: (1) venue selection based on user's preferences and (2) venue closeness based on geographic information in order to provide recommendations about venues.

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Problems faced by Existing VRS:

1. The VRS are suffer with numerous limitations and challenges. A major challenge for such system is to process data at a real time and extract preferred venues from a huge data.
2. Another challenge is which factors or features to consider while extracting venues from large data set in order to provide recommendations accurately or more precisely.

II. RELATED WORK

In earlier venue recommendation systems, most work focused on trajectorybased approaches [2]-[4]. Such approaches kept record of information about a user's visit pattern to various location, the routes taken. In [4] most popular venues are recommended by using machine learning and data mining techniques on trajectory data. These routes based systems therefore recommend locations to users based on their past routes trace or trajectories. The main drawback of such systems is that they have not considered other dominant factors other than GPS trace and hence resulted in providing poor quality of recommendations. Usually user does not visit many places often, so there are less entries exists in user-venue matrix which results in data sparseness issue. In [3] authors have proposed friend-based collaborative filtering (FCF) approach by evaluating the strong tie between social friends for recommending locations based on ratings given by social friends to commonly visited places.

In [3] authors have considered only friends when processing collaborative filtering for a targeted user, since non-friend users do not have much value for reference in recommendation. In [5] authors have proposed Geosocial DB framework which provides location-based social networking services such as location-based news feed, location-based news ranking, and location-based recommendation. In [5] they have provided recommendations for hotels or restaurants within a range distance from the user's location. YerachDoytsheret al. [8] have implemented social-based recommendation of routes. In a social-based route recommendation, a user uprovides source and target locations and the goal is to find routes from the source to the target, that are frequentlytraveled by users who are related to u in the social network by using query language that is based on graph-traversal and ordering operations to speed up the formulation of queries over the network. Most of the above-mentioned approaches have used memory-based CF which provides recommendations to users on the basis of their past entries. However, such approaches experiences common drawbacks of memory-based CF (e.g. cold start and data sparsity) which degrades their performance. In [7] authors have proposed random-walk with-restart approach on a user-venue check-in matrix to generate personalized recommendations. In [10] the system incorporated factors such as personal preferences, past check-ins and current context, such as time and location, and collaborative social opinions (other individuals' preferences) while recommending the venues. However, the system does not consider the reviews for the venues which can dramatically help in refining the recommendations. In [11] the system provides a feature-based summary of a large number of customer reviews of a product sold online, based on data mining and natural language processing methods. However, this system has not ranked the extracted features.

In [12] authors have proposed a method to identify and extract opinion features from online reviews. It identifies candidate features that are specific to the given review domain and yet not overly generic (domain independent). The proposed method considered positive and negative opinions. In [1] authors have proposed Bi-objective recommendation framework for mobile social networks which generates recommendations by considering person's geographical location and venue closeness. But it has not considered venue reviews for recommendations. After surveying we realized Reviews are one of the dominant factors affecting the recommendation as it contains experienced user's opinions which can be greatly leveraged to improve the recommendation as reviews reflect the actual experience of the users who have visited the venues.

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III. MOTIVATION

The existing Venue Recommendation Systems seldom used the enormous amount of data in the form of reviews for venues. Reviews contain the information regarding the Venues and their features. This information when extracted appropriately and efficiently can be used to effectively to provide accurate recommendations.

For e.g. John goes to a location XYZ. Considering the venue closeness to his location and the expert user check-ins, we get *n* venues in recommendations. However, John cannot go through the reviews of all the *n* locations manually and might not be able to select the best suited venue for him. Our system does the tedious job of going through the reviews and extracting the information (features) and rank them according to the expert user's opinions. Which would help the system in recommending most appropriate venues to John based on reviews.

IV. PROPOSED WORK

In the proposed system users GPS coordinates are determined and taken as an input for the VRS. The system retrieves a set of venues near to the user's location. This is done by calculating the geo-spatial distance between the user and the venue. Further we have a set of expert users who have multiple check-ins at various venues. Considering the number of check-ins at a particular venue we refine the set of venues retrieved from the closeness. The more the number of check-ins by expert user the more likely the venue will be shortlisted for recommendation. As reviews play a very vital role in judging a venue it is must to go through the reviews of the venues we obtained in 2nd step. The reviews are processed and the aspects are extracted from the reviews. Ranking is done based on the cumulative opinion of the venue from the reviews. Hence refining the recommendation and further increasing the recommendation accuracy and precision.

Our Proposed system consist of following modules:

• **Ranking Module**: It extract a set of popular venues and expert users. We call a venue as popular, if it is visited by many expert users, and a user as expert if (s) he has visited many popular venues.

• **Mapping Module:** The mapping module computes similarity graphs among expert users for a given region during pre-processing phase. The mapping module also computes venue closeness based on geographical distance between the current user and popular venues.

• **Opinion target and word extraction:** It extracts the opinion words and target opinion from the reviews of the venues. This raw data is used to classify the aspects as good or bad.

• **Aspect ranking:** This module uses the below two factors to find the important aspects of the venue:

- They are frequently commented in reviews.

- Users' opinions on these aspects greatly influence their overall opinions on the venue

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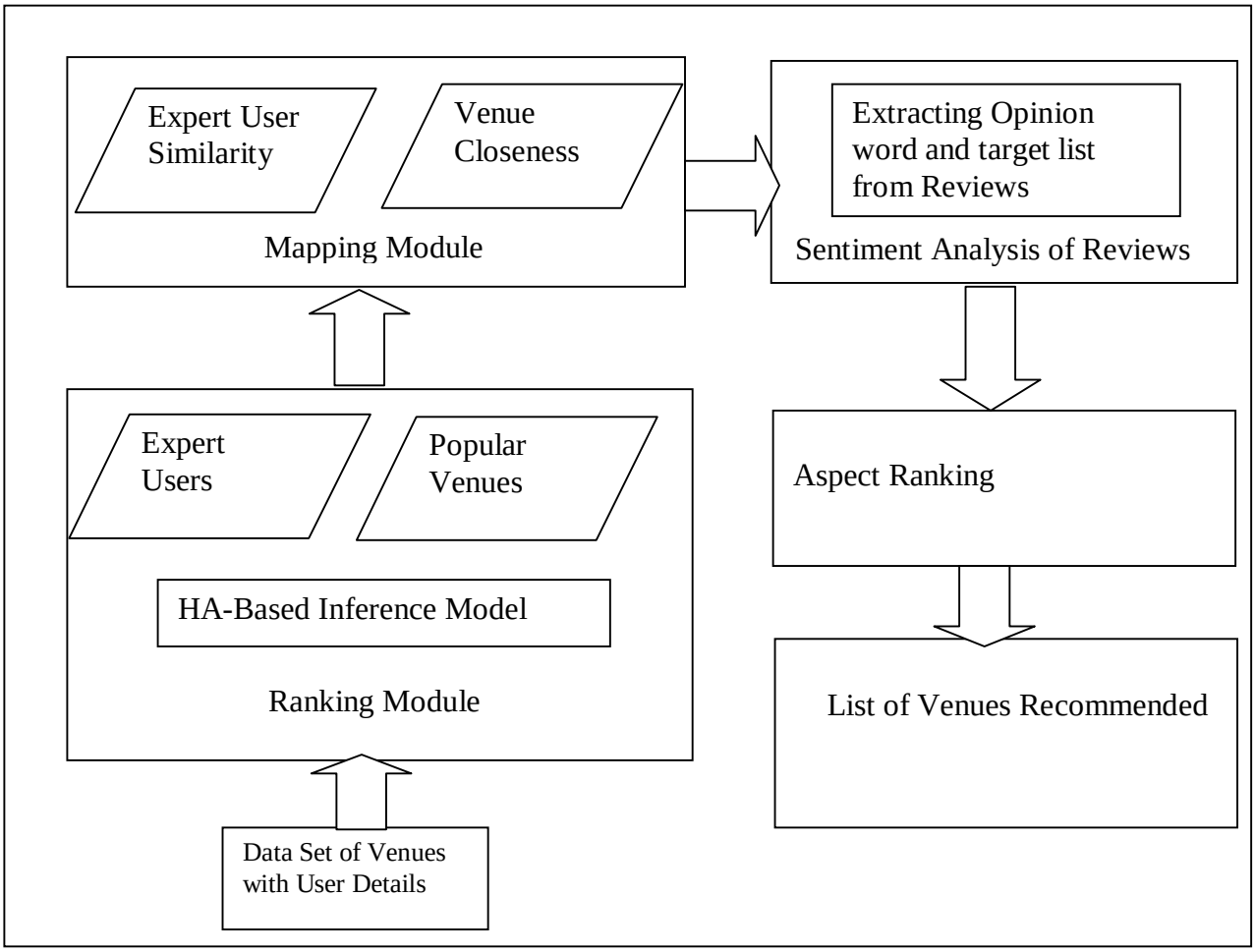
Figure: Proposed System Architecture



V. CONCLUSION AND FUTURE WORK

According to the survey conducted, the present VRS system considered the venue closeness as a major factor while recommending, however with the rise in number of venues it's essential to recommend the best suited venue to a user. Information regarding a venue can be accurately extracted from the reviews of the users as they convey the experience of a user had atavenue. This piece of information is very useful while recommending the venues and hence will be incorporating a VRS which along with the venue closeness will take into consideration the reviews of the user who has visited the venue.

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BIOGRAPHY

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