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ALQRS: A Simple Architecture for Location Queries in Recommender Systems

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Abstract: The ALQRS proposes a location-query system based on the keyword search that calculates for the nearest location. ALQRS evaluates user partitioning for user locations and travel penalty for item locations. ALQRS uses gap keeping approach for sorting, store the values of locations and it is a good space saving technique.
Keywords—Gap keeping approach, Keyword search, Location, Recommender systems, Spatial coordinates.

I. INTRODUCTION

Recommender systems use community opinions to recognize the items from a larger search space. So that, easily a user can selects or recommend an item. Recommender system focused on specific category of items (Examples: CD'S, News, Books, Locations of some places) and its blueprint and interior techniques required for recommendations. The techniques which are used in recommender systems are collaborative filtering. Collaborative filtering is based on precedent community opinions which analyze to discover correlations of like users and items to propose N adapted items to a querying user U. Community opinions are to be articulated through open ratings which are represented in the form of triplet (User, Rating, Item).

Presently, some of the innumerable applications which are based on locations of an item or user's produces location based ratings. Examples included locations of restaurants, theaters and also a few categories of books, CD'S. This kind of recommender systems allow users to register at spatial destinations and rate their visit, thus are competent of associating both user and the item with their ratings. This type of ratings motivates an appealing model for location aware recommendations.

In this paper, ALQRS proposed a new location aware recommender system which built completely to produce high quality location based recommendation. It generates recommendations using arrangement of three kinds of location based ratings within a particular framework/ structure. Those are 1: Spatial Ratings for Non Spatial Items, 2: Non Spatial Ratings for Spatial Items, and 3: Spatial Ratings for Spatial Items.

MOTIVATION: A STUDY OF LOCATION BASED RATINGS IN ALQRS

The location based ratings of ALQRS can be taken from the real world online data (say restaurant). The ALQRS can be proven that it is efficient and scalable and it supports for all spatial properties of both user and item at a time. In general the spatial properties are depended on location of either user or item. So, the location can be taken as coordinates (say x, y) for both user and item. The location based ratings is mainly depended on preference locality and travel locality. ALQRS supports for both.

Preference locality:

Preference locality suggests that users from a spatial region (e.g., locality) prefer items (e.g., movies, restaurants, destinations) that are distinctly different than items preferred by users from other adjacent regions. Preference locality suggests that recommendations should be inclined by location based ratings spatially close to the user. The localization influences recommendation within the spatial region containing the user using the single preferences which are found.

Travel locality/Travel penalty:

Travel locality/travel penalty is the recommended items are presented in spatial; users are likely to travel in a limited distance for visiting these spatial destinations. It is termed as travel penalty. Whenever the travel locality can't be considered then the users wants to travel with onerous travel distance (e.g., a user in Bangalore receiving a restaurant recommendation in Mumbai). Whenever the user needs that restaurant item then he/she desires to travel with burdensome distance. So, the travel locality supports for the distance.

II. EXISTING RECOMMENDER SYSTEM

Non Spatial User Ratings for Non Spatial Items:

It is represented by three tuple (User, Rating, Item). This type of recommender systems includes neither the locations of items nor the locations of users. So, it is difficult to produce a fully recommendation set to the user. Examples A user rated a coffee cafe.

Location Aware Recommender Systems:

The location aware recommender systems produces recommendations based upon the location based ratings. But, the architecture produces the partial location based ratings.. Due to partial maintenance of pyramid data structure the partitioning of user can be done irregularly. It supports for item based collaborative filtering for some existent.

Disadvantages:

1. It provides an incomplete architecture for producing recommendations.
2. Maintains of Partitioning the user makes more expensive.
3. It doesn't consider the spatial properties of either the user or item.

III. PROPOSED SYSTEM

ALQRS: A Simple Architecture for Location Queries in Recommender Systems:

It supports for both user partitioning and travel penalty techniques. ALQRS can apply these techniques either independently or jointly, depending on the type of location-based rating available.

Objective:

The objective for implementing ALQRS is to cover the spatial properties of both item and user. The ALQRS adapts for the gap keeping approach and keyword/item search for searching an item.
The classification of location based rating tuples in ALQRS is as follows:

Spatial User Ratings for Non Spatial items:

It is represented by four rating tuple (User, Ulocation, Rating, Item), here, Ulocation defines the user location. Examples are a user located at his/her home rating a movie, a user located at his/her shop rating a CD. The main design for considering Spatial Rating for Non Spatial items is to make use of favorite locality. The necessary requirements for producing recommendations are Locality, Scalability, and Influence. The idea for specifying this type of systems is to divide the rating tuples into spatial regions based on Ulocation attribute.

Non Spatial User Ratings for Spatial Items:

It is represented by four rating tuple (User, Rating, Item, Ilocation), here, Ilocation defines the item location. Examples are a user with unidentified location rating a theater, a user with unknown location rating a shopping mall. The main design for considering Non Spatial Rating for Spatial items is to make use of travel penalty.

Spatial User Ratings for Spatial Items:

It is represented by five rating tuple (User, Ulocation, Rating, Item, Ilocation), here, Ulocation defines the user location and Ilocation defines the item location. Examples are a user at his/her company rating a restaurant visited for dinner and a user at his/her home rating a theater visited for enjoyment. The main design for considering Spatial Rating for Spatial items is to utilize both user partitioning as well as travel penalty.

Advantages:

1. ALQRS increases the performance of the systems.
2. ALQRS provides higher security than existing recommender systems.
3. System scalability and locality is also high when compared with the existing systems.
4. ALQRS supports for both conventional as well as the proposed properties.

IV. SYSTEM ARCHITECTURE

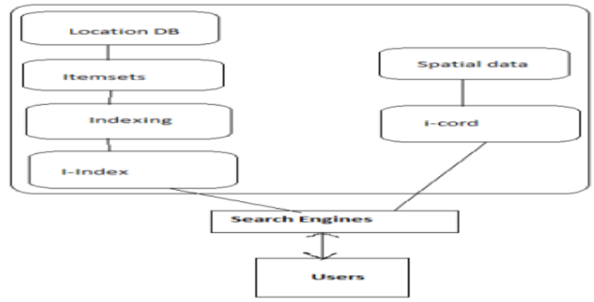

Fig 1: A Simple Architecture for ALQRS.

Explanation:

. In general the architecture describes how the system has been working. Here, the data has been retrieved from location db whenever user requests for a query based on keywords through search engines. The user query/request can be sent to the server from anywhere in the geographical area i.e., spatial data. Based on the query the details of the particular site or an item will be retrieved. By taking all the Itemsets that are related to the request query, indexing on the items is performed. Whenever a user requests for query, the item list are sorted by considering the coordinates of the user and compares the values with place that user specified. The values are stored by using gap keeping approach. Each item can be represented with a i-index value. And finally, it displays the item which is nearest to the user location with some recommendations.

V. RESULTS and TABLES

The ALQRS simulation result is shown below:

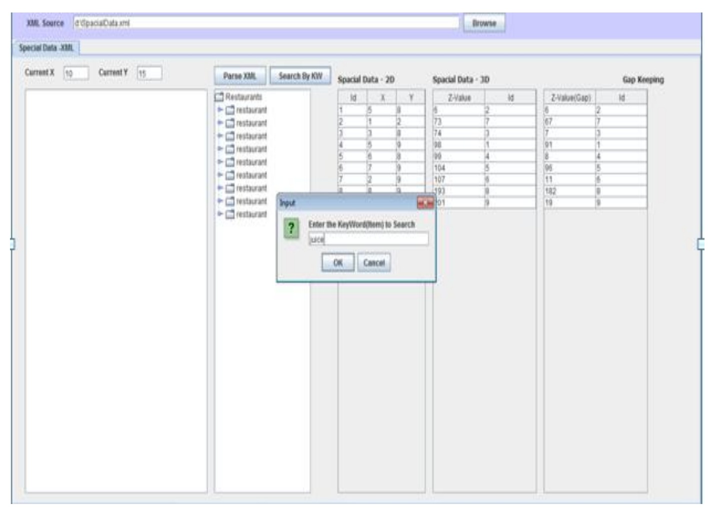

Fig 2: The keyword search begins by entering the item by user.

Keyword search:

This keyword search the item or a keyword i.e., entered by the user for searching. It is helpful for obtaining the result of the particular item along with its rating and distance from the user.
E.g. juice.

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The juice is a keyword entered by the user as shown in fig: 2. Parsing of xml starts when user search for item.

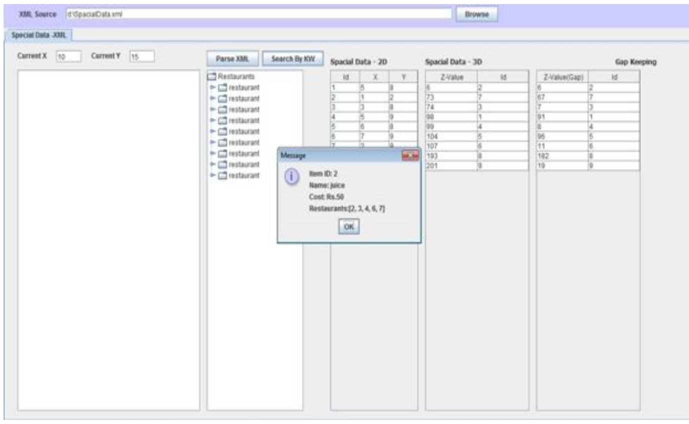

Fig 3: It represents the locations of juice in various restaurants and its cost, id.

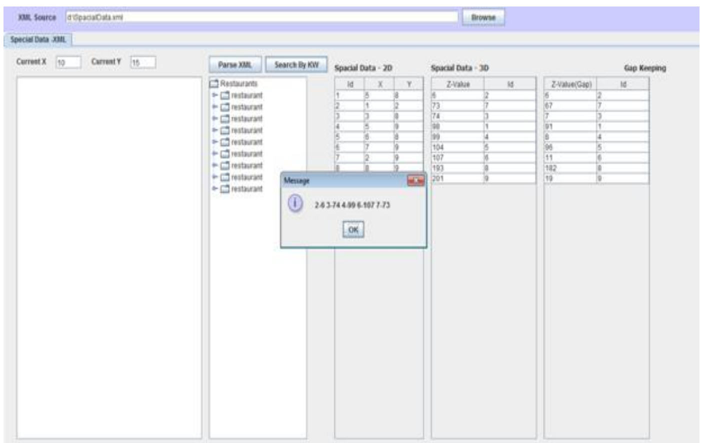

Fig 4: The i-coord values of nearest locations are shown.

The i-coord values are used for indexing and also calculating the i-index values.

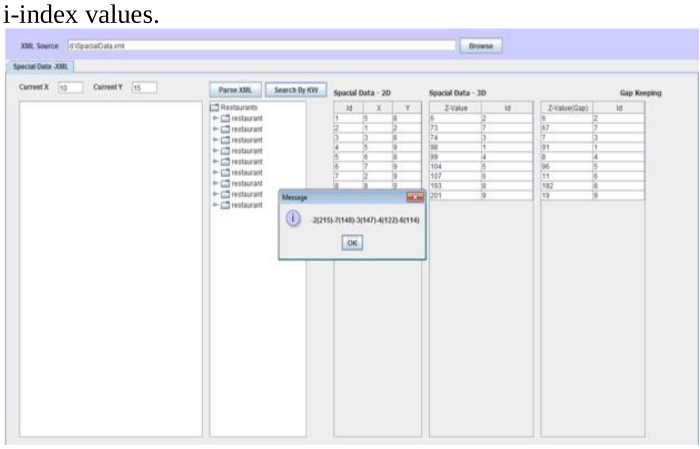

Fig 5: The distances between user location and each nearest locations are shown.

Here, the above three figures namely 3, 4, 5 are showing the processing work at server side.

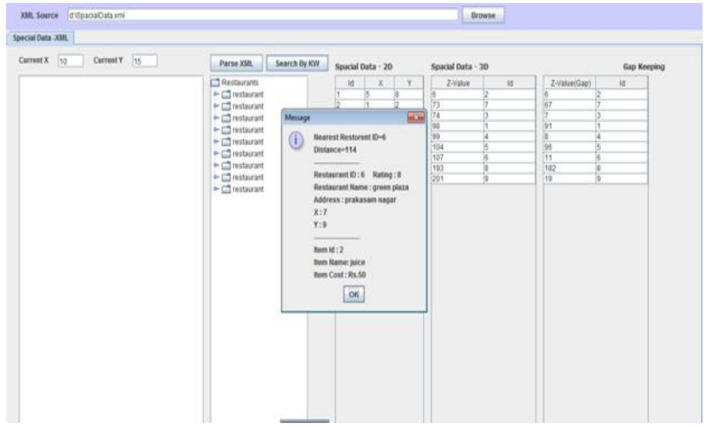

Fig 6: The final result showing the nearest location with its item, its spatial coordinates and their ratings.

The gap keeping approach is shown in above fig 6: the Z-value is nothing but the single value.

Gap keeping approach:

This approach requires a sorted order list of ID or single value. The ALQRS supports for all three rating tuples and. The spatial properties of coordinates are considered in ALQRS, it includes both X and Y coordinates. But, this approach is suitable for applying when single values are taken. For that merging of both the coordinates as in a single value as ID .Then, sorted the list based upon the ID. It leads to good space saving.

Examples of gap keeping approach includes as follows:

Here, the table1 includes the location values of a location and its corresponding Z-values. This table of values doesn’t supports for gap keeping approach.

Location	Value
P2	6
P4	73
P1	74
P3	98

Tab1: This table shows the arrangement of restaurant locations before gap keeping.

Here, the table2 shows that the sorting of location values can be done by implementing gap keeping approach and it makes a good storage and space savings.

Location	Value
P2	6
P4	67
P1	7
P3	91

Tab2: After gap keeping the arrangement of restaurant locations.

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Data structure in ALQRS:

R-trees are used as data structures in ALQRS. Because, the storage of values can be done spatially. Operations like retrieving, searching, inserting, recommending etc are done at spatial destinations.

Database in ALQRS:

The processing data in ALQRS is retrieved through xml formats at spatial destinations. Because, the data structures are R-trees in ALQRS and whenever the data is asked for the particular database admin and they used to give data in of xml format rather than database tables. Here, database values are xml values. Parsing of xml can be done whenever the user asks for a query. The xml values are in the form of the hierarchical structure. So, retrieving of values can be done easily. After parsing has been completed then remaining process can be done in the server.

VI. CONCLUSION

ALQRS produces recommendations including spatial properties of both the items and the users. Recommendation quality is also satisfied. The ALQRS supports for online applications. In online method the exact travel penalties of location are provided but, it is expensive. The scope can be extended by making it less expensive.

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