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Location Aware Recommender Using Food CRM with Misscall Alter System

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ABSTRACT: LARS, To produce recommendation, a location-aware recommender system uses location-based ratings. LARS gives item recommendation based on location using location based algorithm, which uses history of retailer who are closer in travel distance to querying users that avoids external access to all spatial items. This application is useful for the Company Owner, Distributor and Retailer or the wholesaler. The system uses two algorithm to track retailers location which are KNN and Location Based Recommendation algorithm. The System is developed for the business organizations to manage customers data to improve their profit which will help to increase the organizations business. It provides features that help to business organizations to increase communication with their customers using some facilities of the system such as Email and SMS facilities along with customers details and data. The application is related with all the food products like Ground Nut oil, Soybean Oil, Dal and Pulses, Turmeric Powder, Coriander powder etc.

KEYWORDS: Recommender system, spatial, non-spatial, Collaborative filtering, Nearest Neighbor.

I. INTRODUCTION

Recommender systems take review of users to identify useful items from a large search space. Collaborative filtering (CF) is a technique used by many of these systems, find similarity between similar users and items to suggest items that will be required to users based on past community opinions. Numeric rating gives recommendation for an item to express community opinions using explicit rating. [3] LARS, uses location-based ratings to produce recommendations is proposed. Neither spatial properties of users nor items are considered by Traditional Recommender Systems. LARS exploits item locations using travel penalty, to maintain retailers base location. This application is useful for Company Owner, Distributor and Retailer. This system is developed to manage their customers data effectively and to improve their profit which will help to increase the organizations business. [1] This application is related with all the food products like Ground Nut oil, Soybean Oil, Dal and Pulses, Turmeric Powder, Coriander powder etc. It also provides the customization facility to Admin to handle all responsibilities of system that can customize this system as per his/her organizational needs like add the product category and subcategory. Business organizations can manage their Distributor and Retailer management and support tasks through this system. Retailer gives miss call to distributor with registered Contact number. Then Distributor gives recommendation to retailer based on retailers history and location. Here the retailer can book the order just give the simple missed call on the websites Toll-free no (Missed call no). Then his/her mobile no is updated to respective Distributor and the Admin panel. Here the admin can add the distributor and maintain all the data regarding distributor like Placed order, Date wise Order report, list of Distributor list.

II. LITERATURE SURVEY

- **G.Linden**, Provides facility like E-commerce Web sites. Which uses Item-to-Item Collaborative Filtering Recommendation algorithms, They worked on customer's interests to produce recommendation. Here list of items are used customers purchase and explicitly gives rating to represent their interests, and also use other attributes, including items viewed, demographic data, subject interests, and favorite artists. A large retailer might have huge amounts of data, tens of millions of customers and millions of distinct catalog items. Many applications require the results to be returned in real time instantly, also with high-quality recommendations. New users have few information, based on less purchases or

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product ratings. Older customers can have a plenty of information, based on previous history, thousands of purchases and ratings. Customer data is always changes as per requirement: Each interaction provides valuable customer data, and the algorithm must respond immediately to new information. Three common methods to solve the recommendation problem: traditional collaborative filtering, cluster models, and search-based methods. Here, we compare these methods with our algorithm, which we call item-to-item collaborative filtering.[5,11]

- **Namita Mittal**, Developed Recommender system framework using clustering and collaborative filtering provides benefits like, Easy to implement, Not requires content of items, New data is added easily but also there are some problem which are cold start problem which is new user dont have efficient data for recommendation, it does not provide scalability. To solve this problems item-based filtering is used.[9]
- **J.Konstan, and J.Riedl**, This paper represent, Item-Based Collaborative Filtering Recommendation Algorithms are reviewed by prior researchers and did analysis of various accuracy metrics on one content domain where all the tested metrics overlapped into equivalence classes. Metrics within each equivalency class were strongly correlated, while metrics from different equivalency classes were uncorrelated.[6]
- **J.J.Levandoski, M.Sarwat, A.Eldawy, and M.F.Mokbel**, The CityVoyager system is used to mines a users personal GPS trajectory data to determine her preferred shopping sites, and provides recommendation based on the system predicts the user who will be used to these items in future. The spatial activity recommendation system mines GPS trajectory data with embedded user-provided tags in order to detect interesting activities located in a city. It uses this data to answer two query types: (a) Given an activity type, return where in the city this activity is happening, and (b) Given an explicit spatial region, provide the activities available in this region. Geomeasured friend-based collaborative filtering produces recommendations by using only ratings that are from querying user's social network friends that live in the same city. This technique only addresses user location
- **Mohamed F.Mokbel Xiaopeng Xiong Walid G.Aref**, This paper gives new algorithm which is the Scalable Incremental hashbased Algorithm (SINA) for evaluating a set of concurrent continuous spatio-temporal queries. Two goals are defined by SINA: (1) The number of concurrent continuous spatio-temporal queries for scalability, and (2) Continuous spatio-temporal queries to provide Incremental Evaluation. Scalability of SINA To achieve scalability SINA employed a shared execution paradigm which gives execution of continuous spatio-temporal queries is abstracted as a spatial join between a set of moving objects and a set of moving queries. Updates of the previously reported answer are used for incremental evaluation[8].
- **Gediminas Adomavicius and Alexander Tuzhilin**, This paper, describes limitations of current recommendation methods and discusses possible extensions that are used to improve recommendation capabilities and make recommender systems applicable to an even broader range of applications[7]
- **Norma Saiph Savage, Maciej Baranski** The purpose of this investigation is to design ubiquitous location based recommendation algorithm which uses user's preferences and also make use of geography. In this system user's preferences are understand by mining a person's social network profile[9].

In many organizations the Distributor's and the retailer or the wholesaler data is managed manually so it is very tedious and crucial task to manage huge data manually. Some organizations use the CRM systems to manage their data but it is an e-CRM and it uses internet and centralized data so availability of data is 24/7. And it also provides more functionalities than CRM. Some organizations use CRM but its not provide the facilities of Customization. Many CRM systems has the lack of communication facilities such as mails and SMS communication but this system will provide fully customized e-CRM functionalities to business organization with the advantage of mail, SMS facilities and some more flexible facilities that are not found generally in many CRM systems that are available in market such as Distributor and retailer details management, Book the order through Missed call, Placed orders and sales order management with retailers location, this system uses retailers location to give recommendation to retailer.

III. SCOPE OF RESEARCH

LARS, used to produce high-quality location-based recommendations in an efficient manner. LARS produces recommendations, to overcome traditional recommendation problem that uses community opinion history. Our application first identify location of user from users system. Once location is tracked all nearest retailer are find out with help of nearest neighbor algorithm. To give location based recommen-dation distributor use history and request of

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nearest retailers food request. Based on nearest neighbor and retailer and requested retailers history recommendation is given to retailer. Rating given to Requested retailer is based on his own history and nearest neighbor history. By using this technique we will get location based collaborative Filtering.

To find out location of user Used registered mobile number to track base location of retailer using GPS system. The system is to provide the best solutions to the organizations to manage all their data about Distributors, Retailers and the Customers. Provides a system to maintain data with a Admin interface which must be attractive and easy to understand and use for non-technical users.

Provides a centralized database to maintain data with a user interface which must be attractive and easy to understandable. Here Admin can add the main category and subcategory of the product in the database. Admin panel manages all activities that are required to manage data related to recommendation. The distributor has the authority to do the registration of the respective retailer or the wholesaler. Distributors have the options to see the total list of the registered retailer and Search, Edit, Delete, View details. Distributor places the order of the respective retailer or the wholesaler. And also see the Order details of Retailer, Admin, means what are the order is already placed by the admin to this respective Distributor. With help of this distributor gives recommendation to retailer using previous order details. Re-tailer just gives missed call on the websites toll free number to book the order through respective Distributor. Provides an inbuilt call back and SMS gateway system to maintain communication between the distributor and the retailer to give recommendation results. Missed Call service is a completely automated web based services which gives us real time notifications of all phone calls on your dedicated Mobile/Land Phone/Toll Free Number which is registered. When a new call arrives on distributors number, our system automatically rejects the call after one ring and distributor notifies about request from retailer and gives list of recommended food item to retailer in form of SMS

IV. PROPOSED METHODOLOGY AND DISCUSSION

LARS uses spatial items ratings for non-spatial items to produce recommendation, i.e. the tuple (user; ; rating; item; user location), by using a user partitioning technique that exploits preference locality.

A. ALGORITHMS

There are two proposed algorithms:

1. K-nearest neighbor algorithm
2. Location-Based Recommendation algorithm.

i. K-Nearest Neighbor Algorithm KNN is used to find out nearest retailer from requested retailers location. For a given query from retailers request, R_q (Retailers Request), is classified into, Let $x_1; x_2; \dots; x_k$ denote the k instances from requested retailers location. Return the class that represents the maximum of the k instances.

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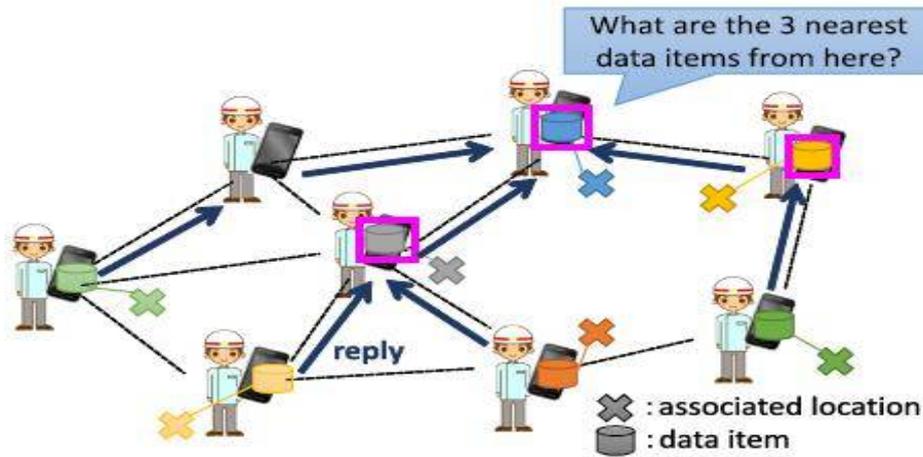


Figure 1. KNN query handling in LARS

KNN is used to find out nearest neighbor in that nodes find out needed data items where querying node may retrieve kNNs from nodes within region. Hence appropriate catching of data items reduces traffic and response time in searching.

Here Querying node is Retailer who have it's own location and that location is work as query point. It is efficient for nodes to cache data items whose locations are near their own. [8,10,11]

ii. Location-Based Recommendation algorithm

Collaborative Filtering Technique used with Preference locality filtering and Travel Penalty Filtering to implement new algorithm which is Location-Based Recommendation Algorithm. KNN algorithms result is used by location based recommendation algorithm to give location based recommendation.

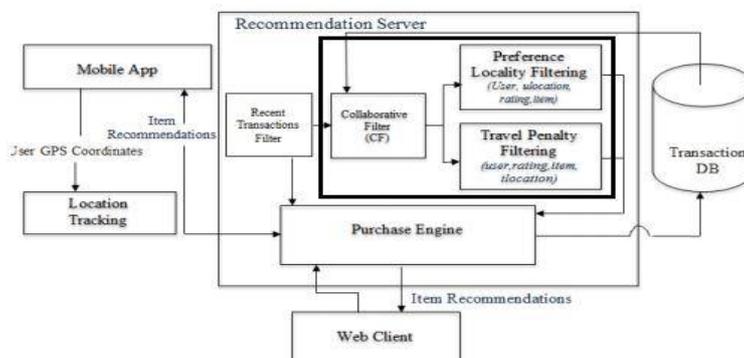


Figure 2. Architecture of LARS

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B. STEPS TO IMPLEMENT ALGORITHM IS:

1. Model Building

Used to compute a similarity score by using $\text{sim}(i_p; i_q)$ for each pair of objects i_p and i_q which have at least one common rating. Using these scores, a model is built which scores each item $i \in I$, a list L of similar items ordered by a similarity score $\text{sim}(i_p; i_q)$. Building this model is an $O(R, U)$ function, where R and U are the number of ratings which are history of nearest retailer and users, respectively. Model size is reduced by storing, each list L , only in the n most similar items with the highest similarity scores [6]. The value of n is referred to as the model size and is usually much less than $|I|$.

2. Statistics Maintenance:

For Given querying user u , recommendations are produced by computing user u 's predicted rating $P(u, i)$ for each item i not rated by u [6]:

$$P(u, i) = \frac{\sum_{l \in L} \text{sim}(i, l) r_{u, l}}{\sum_{l \in L} \text{sim}(i, l)}$$

Before this computation, we reduce each similarity list L to contain only items rated by user u . The prediction is the sum of $r_{u, l} \cdot \text{sim}(i, l)$, have a user u 's rating for a related item $l \in L$ weighted by the similarity of l to candidate item i , the sum of similarity scores between i and l is used to normalized results. The user receives as recommendations the top- k items ranked by $P(u, i)$.

3. Computing Similarity.

Each item as a vector in the user-rating space of the rating matrix is used to compute $\text{sim}(i_p; i_q)$. There are different similarity functions have been proposed (e.g., Pearson Correlation, Cosine); Here use the Cosine similarity in LARS* due to its popularity:

$$\text{sim}(i_p; i_q) = \frac{i_p \cdot i_q}{\|i_p\| \|i_q\|}$$

This score is calculated using the vector's co-rated dimensions, e.g., the Cosine similarity between i_p and i_q in calculated using the circled co-rated dimensions.

4. Preference Locality Filtering (User, user location, item, preference):

Preference locality is prefer users from a spatial region (e.g., neighborhood) prefer items (e.g. Food items, Retailers location) that are manifestly different than items preferred by retailer from other, even adjacent, regions. Preference locality suggests that recommendations given by location based ratings spatially close to the user. The intuition is localization influences recommendation by using unique preferences found within the spatial region containing the user. [12, 13]

5. Travel Penalty (user, user_location, location):

Recommended items list are spatial, users tend to travel a limited distance when visiting these venues called as travel locality. This observation suggests that spatial items closer in travel distance to retailer change as he travel around different location. Retailers base location is one that is register with retailers registration time using, address and phone

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number. To maintain a recommendation efficiency the further a querying retailers travel location and base location must be maintained in order to give recommendation[1].

Table to maintain recommendation efficiency and scalability. At last algorithm Returns Location based recommendation to retailer.

To track location GPS system is used. GPS is to locate a user location, give miscall to distributor to get the user location, service provider . We are not charging money for this tracing or tracking. Tracing and locator service will be useful if you get missed calls often and you need tracking.

Model Rebuilding:

To rebuild model each time checks the retailers history and changes are made to Item Rating.

MATHEMATICAL MODEL

$$S = \{s, e, X, Y, P, M, q\}$$

s=Starting Point

$$s = \{UD; K; L; I; U; k; ij; p; u\}$$

e=End Point

X=input set Y=Output set UD=User Id

K= Numeric limit

L =Location of the user

I={i₁; i₂; i_n }.....set of items

U={u₁; u₂; ::u_m}.....set of users

k=Recommended items.

u=User

$$Y = \{ \text{Location Based recommendation to retailer} \}$$

Prediction is the sum of r_{u,i}, a user u_s rating for item i ,weighted by sim(i ,p) similarity of product p to candidate item i, then normalized by similarity score between i and p. User receives as recommendations the top k-item ranked by pred(u, p).

Function Used:

F1 → Collaborative Filtering: {I; u}

Used Similarity Function is as follows:

$$\text{sim}(i_p; i_q) = \frac{r_{p:i_q}}{\|i_p\| \|i_q\|}$$

F2 → Location-Based Recommendation {uid; l; i}

Prediction Function is as follows:

$$P(u; i) = \frac{\text{sim}(i;l) r_{u;l}}{1 \in \text{sim}(i;l)}$$

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F3→K-nearest neighbor:Searches different retailers in location with nearest neighbor

Success:Gives list of recommended items to retailer.

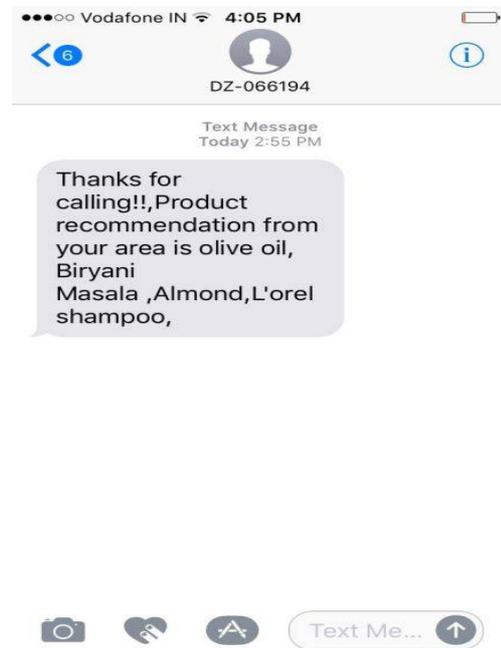
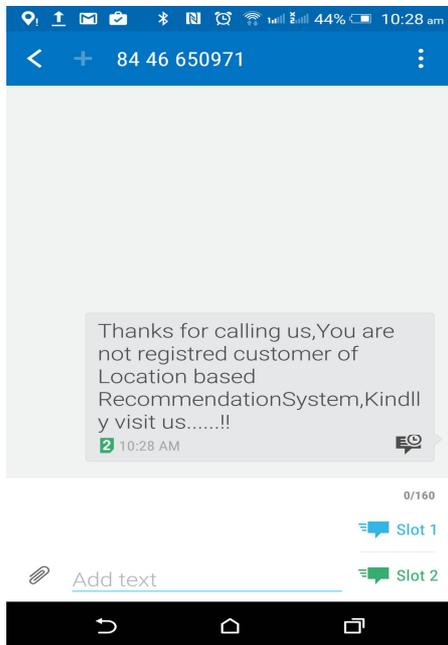
Failure:False Results

V. RESULTS

Results are related to nearest search location using KNN algorithm and location based recommendation which is based on collaborative filtering(CF).Our first module i.e admin to give all access to insert, update and delete dataset.Then distributor gain all data into dataset and provide recommendation using missed call alert.Which is depend on location. In final retailer module,retailer role is purchase all items in our dataset and see recommendation by their rank or stars. To extract spatial user ratings for spatial items from the Foursquare data (i.e., the five-tuple (user, user location, rating, item, i location)),

we map each user visit to a single location-based rating. The user and item attributes are represented by the unique Retailer and location identifier, respectively. We employ the users home city in Food dataset as the u location attribute. And i location attribute is the items.

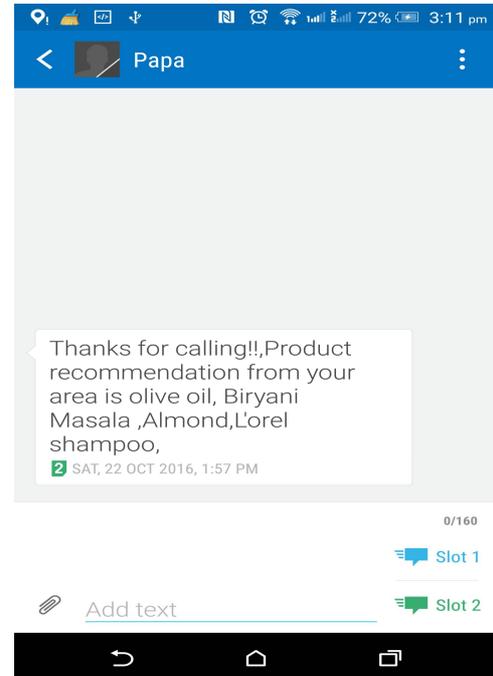
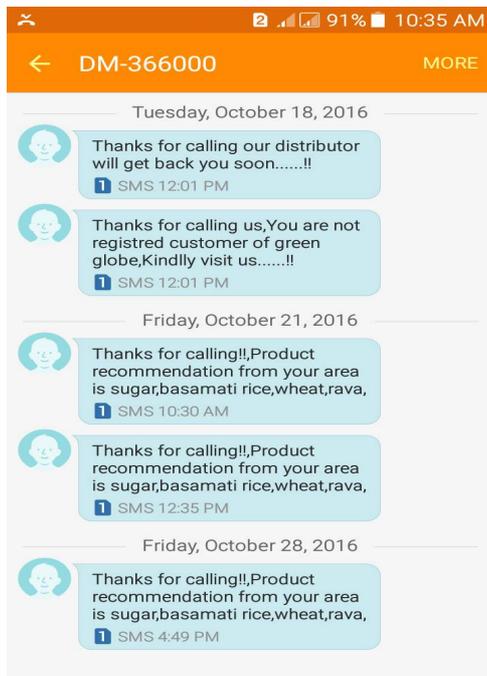
1.Recommendatoin For Retailer Based on location is as follows:



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VI. CONCLUSION AND FUTURE WORK

LARS, proposed location-aware recommender system, tackles a problem that is unsolved by traditional recommender. LARS uses user partitioning and travel penalty techniques to support spatial ratings and spatial items, respectively. Both techniques can be applied separately or in concert to support the various types of location-based ratings. LARS is efficient, scalable, and provides better quality recommendations than techniques used in traditional recommender systems.

In future we plan to make use of more efficient and usable algorithms to focus on the measure of recommendation stability, which reflects the consistency of recommender system predictions.

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BIOGRAPHY

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