Suggestion Synthesizer for Profit Maximization Using Preferences

Divya.R, Kousika.N.

Abstract— In this gloabalized market,it is a challenging task for business people to sustain their customers.Every customer has more number of choices to pick a product or a service what suits for them.Business people spend lakhs and Lakhs of Money for getting feedback from their customers about a product or a service through surveys to improve their business.Since it is a highly competitive environment ,comparing a person's product or service with every other product or a service vendor is a toughest task.Only when we compare we will be able to get a clear idea for offering new services or a product to the customer satisfying their needs.In addition,every business will be having a target customer set.For Example.A restaurant suited in a city's center near by to the bus stop will definitely have soft drinks and chat items.There are several different businesses which will also be available like mobile recharge centers,petty shops with food items like chocolates and etc..But,how they compete for earning profit is the question in the gloabalized market.This paper,deals with the above problem and provides a model that provides solution by Comparing the preferences that user gives and finds out the features that are wanted but are not provided by the business men as a suggestion.

Index Terms— Business environment, Globalization, Market Sustainability,Preferences,Profit Maximization,Suggestion Synthesizer and Target Customer Set.

1 INTRODUCTION

REcommender system is a research area which is getting noticed recently.Business recommender system is a upcoming research area in it.Business recommender system uses Collaborative Spatial computing which has its applications in various domains like Activity planning,Recommender system,disaster rescue and location based social networks. gives prediction about a user with respect to another user's similar interest.

This technology era has two types od data that is commonly shared namely Business based data and location based data.Though this data seems to be individually useful in their own perspective ,this data will yield some more benefits once it is combined.Business is always a competitive challenging field .For an Individual when they wish to improve their business,it is always a tough task.

When they decide to improve their business,they have to do know what their competers offer in what price and what are the need of the day. Our proposed system solves this issue.It uses Inverted Spatial Index to list out the items that were available in the location at the same time solves the profit maximization.The rest of the paper is organised as follows.Section 2,formally depicts how the problem is formulated.Section 3 presents the related works and Section 4 states about the proposed working of the system.

- *Divya.R is currently pursuing masters degree program in Department of Software engineering in Sri Krishna College of Engineering and Technology underAnna University, India, PH-9655932334. E-mail: 14mi001@skcet.ac.in*
- *Kousika.N is currently working as Assistant Professor in Department of Computer Science and engineering in Sri Krishna College of Engineering and Technology under Anna University, India, PH-9655932334. E-mail: kousika@skcet.ac.in*

(*This information is optional; change it according to your need.)*

Some tools that can be used to locate the places that are available for getting a basic idea is Google earth and Google Maps/

2 PROBLEM DEFINITION

All these tools use spatial queries to give a result.Depending on the application,different queries can be used to query a database.Some of them are Constrained nearest neighbor queries(CNN),Multi point Range query,Probabilistic nearest neighbour query and etc.

Set of Spatial objects are returned for the above query.Whever we give a query in the Google,it takes the query input and returns a Map by pinpointing the location of where the object is located,its description and ratings given by the user.Consider the query as "Restaurant nearby to Airport with Pasta" as menu item.The search query will give a result in Google Maps by Pinpointing the locations where restaurants are located by satisfying the query.

Since lot of results have been retuned for a query it gives a awkward look and may mislead a user as a restaurant may have many food items for the customers but has a necessity to taste everything.The proposed system will reduce this problem.Since it is an upcoming research arena,it doesn't have any existing system.

3 RELATED WORKS

Variety of queries have been used to query spatial database.Some queries related to us are as follows.ANN allows the user to specify avalue which acts as a maximum approximation error bound, thus allows the user to control the tradeoff between accuracy and running time in a system.[1].

There are different number of neighbours that are available for a query point satisfying conditions.It is called as K-Nearest Neighbour query.The problem is that this query is suitable for real world applications but efficiency degrades for our system.[2]

Product quantization based approach for approximate nearest neighbor search decomposes the space into a Cartesian product of

low dimensional subspaces and to quantize each subspace separately.[3].

TkLUS queries is another type of query which is useful in many application scenarios such as spatial decision, recommendation and etc. It is definitely inefficient to check the sets iteratively.[4].

GSKCG Queries work as follows.Given a set of spatial query points and an underlying social network, a GSKCG query finds a minimum user group in which the members satisfy certain social relationship and their associated regions can jointly cover all the query points.[5]

There were different data structures like R-Tree,Quad Tree and etc… for querying a database.Among them Inverted Spatial Index structure is as follows.

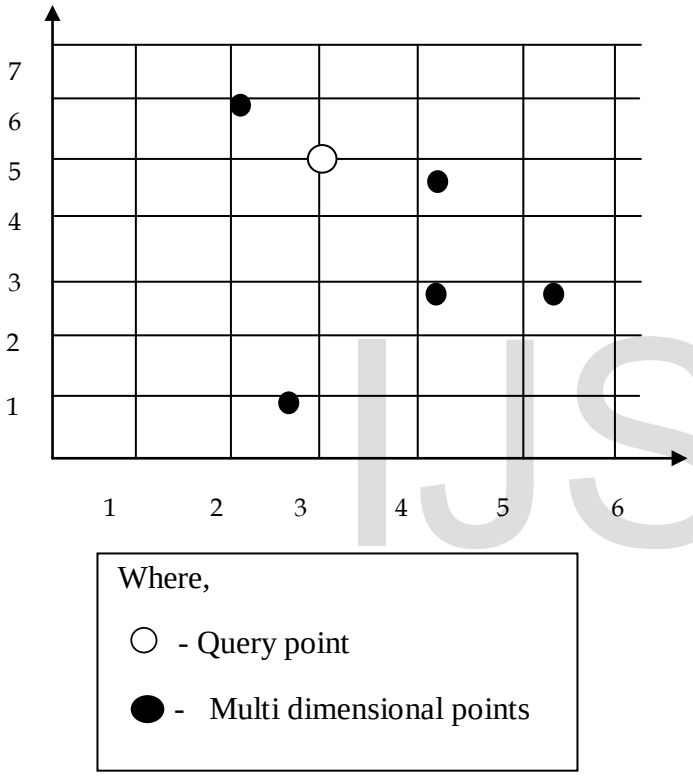

FIG1.(A) LOCATIONS OF POINTS

Let P be a set of multidimensional points.As we combine keyword search with location and textual information on facilities such as restaurants,hotels,etc.,.Here,we mainly focus on dimensionality 2 by considering the points in P with integer co ordinates[0,t],where t is a large integer.The valued coordinates represented in 2D is still finite and enumerable.So with proper scaling we proceed with such consideration.

Each character represented in the graph is an object in P with its textual data as a document is represented by W_p.For example, if alphabets stands for restaurant, W_p can be its menu.In addition,it may also have different useful informations.

A Nearest neighbour (NN query) gives a point q and a set $W_q$of keywords(W_q as the document of the query).It returns the point in $P_q$that is the nearest to q, where P_q is defined as,

$$P_q = \{characteres\ P | W_q \subseteq W_p\}. \ldots. (1)$$

In simple, P_q is the set of objects in P whose documents contain all the keywords in W_q.If the P_q returns is empty, the query returns nothing. This problem as an overall, can be considered as *k* nearest neighbour (*k* NN) search, which finds the *k* points, the entire P_q should be returned.

For example, assume that P consists of 6 points whose locations and a query point q are given as black dots and white dots respectively in the figure 1(A). Table 1 describes the associated text for Characters as below. Consider the query point q at the white dot of fig.2(a) with the set of keywords W_q={f,g}.Nearest neighbour finds D as the nearest neighbour as F misses {f} in it.If k=2,In addition,E is also returned. So the result set contains two character points namely {D,E}.The result set remains unchanged for k=3 or higher values as they were the only two objects that have both the keywords{f,g}.

Inverted Indexes(I-index) have proved to be an effective access method for keyword-based document retrieval. Consider the table 2 below,

Table 1.Associated text for Characters.

P	W_p
A	{a,b,c,d}
B	{c,g}
C	{e,g}
D	{f,g,i}
E	{a,f}

It contains the index for the data set of Table 1.Each word in the vocabulary has an inverted list by pinpointing the ids of the points that have the word in their documents. The list of each word maintains a sorted order of point ids.Thus, it provides considerable convenience in query processing by allowing a merge step.

Given a nearest neighbour query q with the keyword set W_q ,the query algorithm of I-Index first retrieves the set $P_q$of the points that have all the keywords of W_q.Then it ranks them based on the distance from the centre point. Then, our system analyses the menu items which were unique with the menu items of the resultant restaurant's list. Then it considers as how many menu items were repeated and recommends the items that are to be added for our business.

Table 2. Example of an inverted index(I-Tree)

Word	Inverted list
a	A,E
b	A
c	A,B
d	A
e	C
f	D,E
g	D
i	D

4 PROPOSED SYSTEM

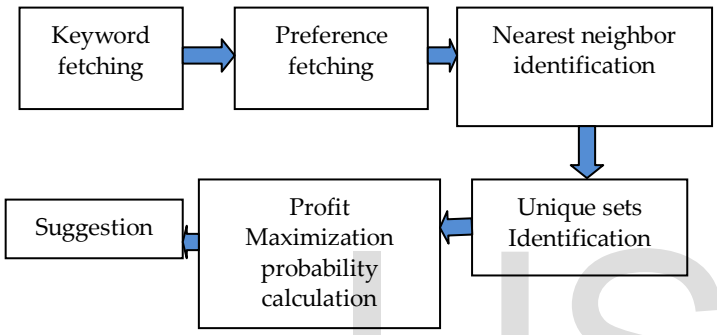

FIG2.PROPOSED SYSTEM ARCHITECTURE

The above figure 2 depicts a system that can solve the stated problem.The modules in the system are as below,

Module 1-Keyword Fetching.
Module 2-Preference Fetching.
Module 3-Nearest neighbor identification.
Module 4-Unique sets identification.
Module 5-Profit Maximization probability calculation.
Module 6-Suggestion.

4.1 KEYWORD FETCHING

This module acts as the first module to obtain keyword from the user.This keyword is the location that the user prefers.

4.2 PREFERENCE FETCHING

This module obtains preferences also called as the target customer set the user targets.This preference acts as the pruning strategy for nearest neighbor identification.

4.3 NEAREST NEIGHBOUR IDENTIFICATION

This module identifies the nearest neighbor available for the location that the user has given for processing.This is a major module and acts as a preliminary stage for synthesizing suggestion to the user.

4.4 UNIQUE SETS IDENTIFICATION

This module is used to identify the unique sets that has been identified from the nearest neighbor.

4.5 PROFIT MAXIMIZATION PROBABILITY CALCULATION

This module calculates the maximum probability for maximizing profit for the user given preferences.This percentage is based on user's preferences and the target customers that the user gives.

4.6 SUGGESTION

This module suggests the items which are unique and gives as a suggestion to the user with the chances for maximum profit.

5 CONCLUSION AND FUTURE WORK

Data structure utilization for such a product decides its performance and data set type decides its usability level from the user's point of view. Achieving 100% accuracy in such a system is practically impossible for such a system. It is due to the different views that a user in selecting the business area and the importance level that they give to the selection criteria. But, this system is an attempt to minimize the work load of a person to start a new business as well as to improve his business. As a future work, the system is planned to be extended with more real world data sets and to give more accurate results for existing users.

ACKNOWLEDGMENT

The authors wish to thank A, B, C. This work was supported in part by a grant from XYZ.

REFERENCES

[1] https://www.cs..umd.edu/~mount/ANN/
[2] H. Poor, "Finding top-k local users in geo-tagged social media data ,Published in Data Engineering (ICDE), M.Sozio,2015 IEEE 31st International Conference on April 2015
[3] Product Quantization using Nearest neighbor Search ,IEEE Transactions on Pattern AnaMachine Intelligence ,Vol.33,No.1,Januvary 2011.
[4] Theory," Web data retrieval: solving spatial range queries using ***k***-nearest neighbor searches,T.Lappas,Springer,DOI-10.1007/s10707-008-0055-2,2009-12.
[5] Geo-Social K-Cover Group Queries for Collaborative Spatial Computing,I.V.Hicks,IEEE Transaction, IEEE Transactions on Knowledge and Data Engineering,October 2015.