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SEARCHING AND TRACKING OF LOCATION BY PROXY BASED APPROACH

K. Nirmala[1] and B. Kanimozhi[2]
Department of Computer Science, Quaid-E-Millath Government College for women, India
E-mail: [1]nimimca@gmail.com, [2]kanimozhibalas@gmail.com

Abstract

Location based services became an important application in recent world. Users can search a location using smart phones and can also track the location. It is also possible for the users to retrieve information about the nearest location. The objective of this paper is to reduce the respond time of the server for the user queries. A proxy based approach is proposed to reduce the waiting time of the user and to increase the information about the location. Many location based services, provides details about the user queries. The proxy based approach creates an Estimated Valid Region which reduces the number of queries approaching the server there by reducing the waiting time of the mobile clients due to server load.

Keywords:

Nearest Neighbour Query, Window Query, Spatial Query Processing, Location-Based Service, Mobile Computing

1. INTRODUCTION

Location search plays a vital role in mobile computing [1]. The search scenario is based on the mobile clients continuously request a server with a location. Because of continuous submission of queries to the user, the server suffers from heavy load and this lead to the long waiting time for the clients. Therefore the delayed response from the server to the client is of no use for the moving clients.

In Modern world, location search attracts different clients. The major applications of LBS are online marketing to meet the customer requirements, also in medical fields to track the location immediately during emergency situations. It is also used in geotagging. Mobile location based gaming is also an important application of LBS which is very much familiar with the children, which plays a vital role in location based services. Because of the large number of clients, the server suffers from heavy server request and the server cannot be able to produce the result in time. Therefore, the proxy server stores the queries from the server and the corresponding valid region (VR) to provide the result in a minimum time for the upcoming users with similar queries [2][3].

In previous researches, a combination of server based and proxy based approach is used but it fails to meet the requirement, because of heavy server load of server. Although storing of location and valid region reduces the server response time for the clients. In practise it is not possible for the server to store these huge amounts of data's from the query result.

2. RELATED WORKS

"LBSs are information services accessible with mobile devices through the mobile network and utilizing the ability to make use of the location of the mobile device. Location-Based services (LBSs), also known as location dependent Information services (LDISs), have been recognized as an important context-aware application in pervasive computing environments [1] is given by Jingling Huang, Chen-Che Huang in 2012. Even though, it provides Valid Region about the location still it suffers from the server load issues.

In 2008, W.S Wei-Shinn Ku Roger Zimmermann and Haixun Wang [9], this paper discuss about the location-Based Spatial Query Processing in Wireless Broadcast Environments. It presents a peer-sharing paradigm, allowing mobile clients to obtain a complete or partial result of the query from other clients in the vicinity. A mobile client only waits for unresolved parts from the LBS server and thus the average waiting time could be reduced.

In recent years, a significant number of research studies have been proposed for spatial query processing. Most of these studies addressed representative spatial queries, such as NN queries, kNN queries, and window queries.

Basically, server-based approaches have the complete information of data objects and can utilize the information to create VRs for mobile clients. On the other hand, proxy approaches possess partial information of objects and consists of proxy deletion algorithm.

3. PROXY SERVER ARCHITECTURE

To overcome the above mentioned problems, a proxy server architecture can be used. The proxy server can provide an Estimated Valid Region (EVR) for the mobile clients.EVR stores large scale of location information. Thus, with the help of proxy architecture, the client can able to obtain the appropriate location from their current location. EVRs provide the results of the query faster even in the absence of valid regions from the server. Because of the EVRs, the smart phones are very much familiar with the users.

Therefore, proxy architecture is considered to be the advantageous because it can be able to provide the results for the subsequent queries from the same location in a short interval of time for a moving client. A proxy mining algorithm is used which deletes the same location information in the proxy server which makes the proxy server more effective.

3.1 DISADVANTAGES OF SERVER APPROACH

Server holds huge amount information which makes the server response slow. Due the continuous query it is not possible for the server to handle more requests simultaneously. In addition to late response, slow growth of EVRs of NN queries and window queries are also the disadvantages in server approach. For NN query, the outcome of an EVR is lessened by the number of queries and locations of queries been launched. For window queries, the VRs are smaller in size so it can hold a less information about the location which results in very small EVRs. The example of VR and EVR is shown in Fig.1. Both NN query

and window query algorithms are executed separately. So, the result of the NN query is not useful to the other queries. This is also a disadvantage in server approach.

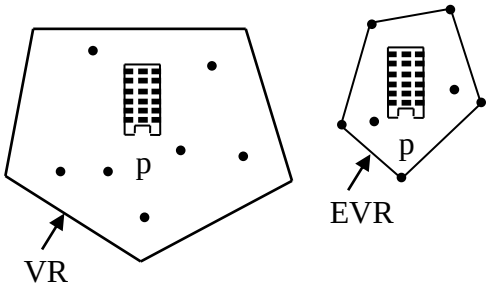

Fig.1. An Example of VR & EVR Systems

3.2 IMPROVEMENT

The proxy architecture improves the server based approach by automatically deleting the repetitive information about the locations. Therefore it reduces the memory space thereby increasing the speed of the server request for the client. The devised proxy algorithm tracks the location information available in the proxy server and takes the count of the locations available. Delete the repeated information which makes the proxy architecture more effective. With the help of deletion algorithm, the proxy architecture provides the result with minimum time.

The two new algorithms EVR Extension and proxy deletion algorithm makes the proxy based approach more effective by providing more information about the location in reduced time. It is explained in Fig.3 and Fig.4.

3.3 SYSTEM ARCHITECTURE

The proxy architecture shown in Fig.2 consists of LBS Server, Proxy Server, Mobile Users and proxy cache to store the location information.

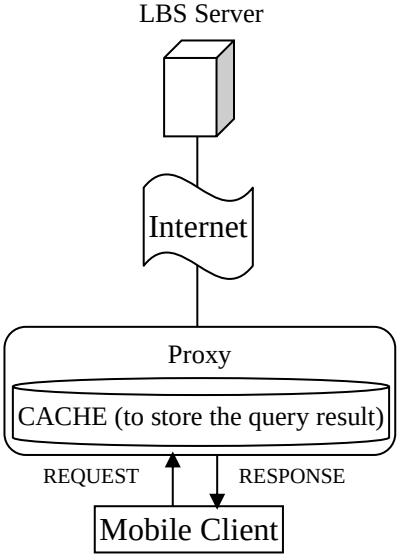

Fig.2. System Architecture

In proxy architecture, a moving client launches a query to the server. The LBS Server in practical will not provide the information about the user queries immediately. So, we introduce a proxy architecture which provides the result of the query in a minimum time. The proxy server acts as an intermediate between the mobile client and the LBS server. The proxy server consists of proxy cache database which stores the frequently required information about the location and also deletes the repetitive information which makes proxy more effective. In addition the proxy server is in charge of avoiding the subsequent queries entering the server.

3.4 PROXY DESIGN

Proxy servers act as an intermediate host between the server and mobile client. The proxy server maintains a cache to store the query request and corresponding response from the server to the user. Such that the previously cited location information are answered directly using the cache database. In addition to reduce the heavy server load, the proxy server is tracked continuously and the proxy maintains a counter which counts the number of occurrences of the query results and deletes if the counter reaches the maximum value which reduces the server load. Let us consider the maximum value to be three, so that once the same ID exists more than three times, it will be deleted automatically. The proxy provides a unique ID for each location. Whenever a proxy receives a query from the mobile client, the proxy server first examines whether the result of the query is available in the proxy server cache, if it is already available in the proxy cache it automatically generates the result by itself. Otherwise, the proxy submits the query to the server, for the received query, the server will return the query result as well as the corresponding EVR to the proxy. Now, the proxy generates the result about the location to the mobile clients and stores the equivalent EVR. With the stored EVR the proxy can able to answer the similar queries by itself. In future this avoids the heavy server load due to continuous submission of queries. Proxy tracking using the location deletes the multiple occurrences, which in turn reduces the heavy server load and saves the proxy cache memory.

3.5 QUERY PROCESSING

The Server can receive two types of queries from the clients. They are Window query and NN query, In case if an user posts a window query, the proxy initially tries to give the result with the help of grid index which consists of locations in EVR. Grid consists of cells, if the grid is fully occupied with the cells then the result of the query is produced by the proxy itself otherwise the proxy will send the query to the LBS server. The server gives the location for the query and also updates the cell in the grid.

If the proxy server receives an NN query, it tries to provide the result by using the EVR. If the proxy server is not able to answer the query, it will pass the query to the LBS server. Then the LBS server provides the result of the query by extending the EVR region. Usually EVR is in the form of circle with radius r. The EVR extension is based on the distance between the first nearest and second nearest object in the circle. After updating the location in the EVR, the proxy can able to answer the same query without the help of LBS server in future which reduces the more number of queries submitted to the server unnecessarily.

3.6 EVR EXTENSION ALGORITHM

This algorithm checks for the count of the location in the proxy server, if the count tends to reach the prescribed number of times then the location which is repeated in the proxy server will be deleted from the proxy server. Continuous tracking of the proxy server for repetitive location makes the proxy server more effective than before and which in turn extends the EVR. Therefore more information about the locations can be stored in EVR.

3.7 PROXY MINING AND DELETION ALGORITHM

The steps for the algorithm are as follows,

Step 1: Check for the multiple entries of information about the queries.

Step 2: Set a minimum value for the number of occurrences of the query result.

Step 3: Count the number of occurrences of keywords using a 'count' variable.

Step 4: If the number of occurrences exceeds the maximum count value.

Step 5: Delete the multiple entries of the query result.

The working of above algorithm is shown in Fig.3 and Fig.4.

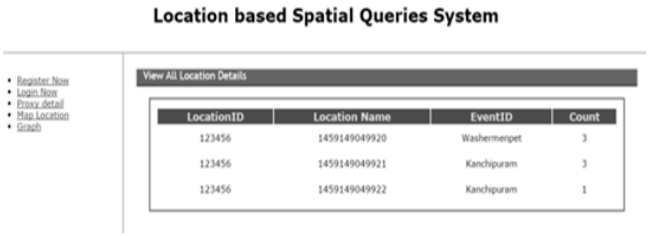

Fig.3. Before deletion

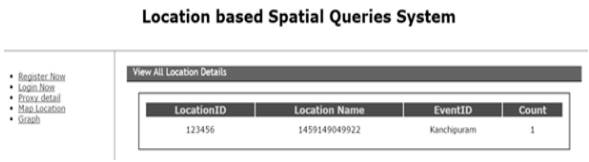

Fig.4. After deletion

3.8 TRACKING GRAPH

The tracking graph shown in Fig.5, explains the movement of the organs, medicines and other items which should be transferred from one place to another place based on the environment from the source place to destination place within the prescribed time.

4. COMPARISONS

4.1 SERVER BASED APPROACH

The server based approach stores a huge amount of information, it also includes the least used information and multiple entries of the same information which is of no use for the clients and because of the huge information the response time of the server becomes very slow, In location search of a moving clients, the delayed information is of no use.

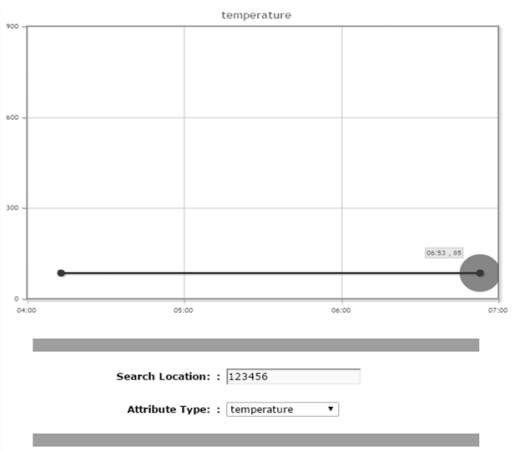

Fig.5. Tracking graph

4.2 PROXY BASED APPROACH

The proxy based maintains a cache to store the location information and also monitors the least used and multiple entries of the information available in the cache and delete the unused information which increases the processing speed of the proxy server. The result is shown in Fig.4.

Due to the deletion of unused information from the server, proxy based approach overcomes the disadvantages of server based approach and satisfies the user request in minimum time.

5. CONCLUSIONS

Location search attracts different clients from different fields. Minimum result processing time is more important in location search. To reduce the processing time of the query, a proxy based approach is used. The proxy-based approach to continuous spatial queries outperforms the drawbacks of previous methods and enables the user to receive quick response for the queries from the server. Using Proxy mining and deletion, the multiple entries of the same event details will be deleted making the proxy more effective than before. Therefore, the users can receive the information about the location in minimum time. In future, a detailed pictorial representation of location information about the geographical information can also be included. Finally, the user gets the pictorial representation of the location.

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