Optimal Route Queries with Arbitrary Order Constraints

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Abstract

The group nearest neighbor query uses group points to provide the optimal solution for the nearest group point in the dataset. The novel type of spatial keyword query called Group Nearest Group (GNG) query will be used to optimize the query. Given a data point set D, a query point set Q and an integer k, the Group Nearest Group query finds a subset of points from D, ω ($|\omega| \leq k$), such that the total distance from all points in Q to the nearest point in ω is no greater than any other subset of points in D. Each nearest point obtained matches at least one of the query keywords. For processing this query several algorithms are proposed. The processing of GNG query consists of Exhaustive Hierarchical Combination algorithm and Subset Hierarchical Refinement algorithm. A group nearest neighbor (GNN) query returns the location of a meeting place that minimizes the aggregate distance from a spread out group of users; for example, a group of users can ask for a restaurant that minimizes the total travel distance from them. The duplicates in the dataset can be identified to improve the search query from the given data. The dataset can be analyzed to find out the duplicates in the data set. The applications of group query come from location-based services, e.g., finding a meeting venue for a group of people such that the traveling distances is minimized. In order to prune large portion of query objects reducing the number of node accesses, this extensive experiments on spatial databases is effective in reducing group query response time which exhibits good scalability with the query objects and the number of query keywords.

Keywords: Query processing and spatial datasets

1. INTRODUCTION

Nearest neighbour search is one of the researches in Information Technology where several algorithms and theoretical performance bounds have been devised for exact and approximate processing in main memory. The nearest query discovers the previously unknown, but potentially useful patterns from spatial databases, trying to find patterns in geographic data. Due to the popularity of search services on the Internet, users are allowed to provide a list of keywords besides the spatial Information of objects, which reduces Scalability and an increase of Query response time. Therefore there is a need for improved training methods, and virtual reality technology for processing this query, which is implemented by means of group nearest group (GNG) search.

Initially the set of Data points, containing the keyword information of query object and the query keyword should be given by the User. By GNG query, each nearest point matches at least one of the query keywords of the User. Next, the user wants to rank the selected locations with respect to the sum of distances to nearest interested facilities. As a result, the best location can be obtained from the minimized summed Distance calculation.

2. PROBLEM STATEMENT

Given a set of data points D, query object Q and query keyword m, a GNK query is implemented to obtain a minimum sum of distances to its nearest points in D. To achieve better performance, a widely used method is to represent the data set by a set of samples and then apply the local search heuristics the typical process of the local search heuristics finds an solution and iteratively optimizes it with the operation of swap

3. PROPOSED SYSTEM

Most traditional spatial queries on spatial databases such as nearest neighbor queries, range queries use CLARNS (Clustering Large Applications based upon Randomized search) of GNG leads to gap of few percentage points missed. The existing system, takes long query processing time and data accuracy problems were identified The proposed system uses two algorithms: Exhaustive Hierarchical Combination (EHC) algorithm and Subset Hierarchical Refinement (SHR) algorithm. Use hierarchical blocks instead of data points to optimize the number of subsets evaluated. This technique aims at minimizing the I/O accesses to the object and feature data sets. Optimized version provides more efficient technique for computing the scores of the objects. It develops solutions for the top-k spatial preference query based on the temporal data. It minimizes the access and reduces search space. In this work, database techniques are explored to boost the GNG query processing of local search heuristics without any loss on clustering quality.

The duplicates in the set can be identified to refine the solution, the search space in lower hierarchical level is minimized. In EHC, every set of k blocks is evaluated in high hierarchical level and the set with the current best value (i.e., the minimum total distance) are refined by visiting their children in next level.EHC is capable to provide the optimal solution.

3.1 DATA GROUP

A real data set of points are collected which consists of the place with the longitude and latitude of the metropolitan city. The synthetic data points were obtained containing the uniformly distributed points around the city. These data sets are unified into a unit region. Q is distributed in an area whose Minimum Bound Rectangle is a percentage of the whole data space, denoted as M. All the data sets are indexed by R-trees for EHC and SHR.

3.2 GROUP COMBINATION

Exhaustive Hierarchical Combination algorithm minimizes the access and evaluation of potential subsets. The data points in EHC are hierarchically represented by data blocks, e.g., using R-tree. The algorithm process GNG query by treating the blocks as points to find an intermediate solution in higher hierarchical level. To refine the solution, the search space in lower hierarchical level is minimized by following the guided search direction.

3.3 SUBSET REFINEMENT

Subset Hierarchical Algorithm is a local search heuristic with support of the database techniques. In higher hierarchical level, each block is treated as a point by SHR to replace every element in the subset, and the resultant subset with the current best value is refined by visiting the children of the block. The solution of SHR is usually close to the global optimum and guaranteed to be within a factor of at most close to the global optimum.

4. EXPERIMENTAL RESULTS

The experiments were conducted using group Query with its minimized distance: sum of the nearest keyword features with respect to the input query object. The experiments implemented in a database of e Coimbatore. Our experiment on GNG Query was implemented by the universe of objects in the database, which is created in a standard environment visual studio 2008 with framework 3.5 by the language of vb.net. The records in the database consist of feature, category, place, latitude and longitude. Initially, the data is fetched from the database for record matching. Next, the records of input object matches with its nearest features. Then the minimized distance of the input object with respect to its nearest features are calculated which is then followed by the calculation of summed distance and will be displayed in the sorted manner. The records in the database consist of feature, category, place, latitude, longitude and index. Based on the index, clustering is done and the data is fetched from the database for record matching. Next, the records of input object matches with its nearest features. Then the minimized distance of the input object with respect to its nearest features are calculated which is then followed by the calculation of summed distance and will be displayed in the sorted manner.

4.1 DATA QUERY POINTS

The input query is processed and the result of nodes with the nearest group points are displayed. The data points near to the mimimal distance are calculated by exhaustive hierarchial combination algorithm.

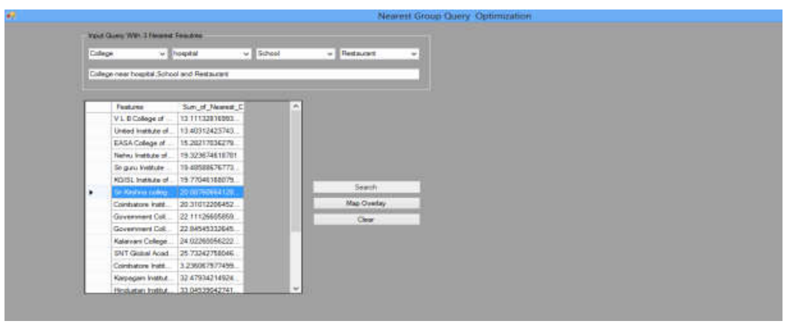

Figure 1. Query Points

4.2 RESULT MAP

The nearest distance of query points are displayed in the map. The mimimal number of paths from the source location is connected by the lines in the graph.

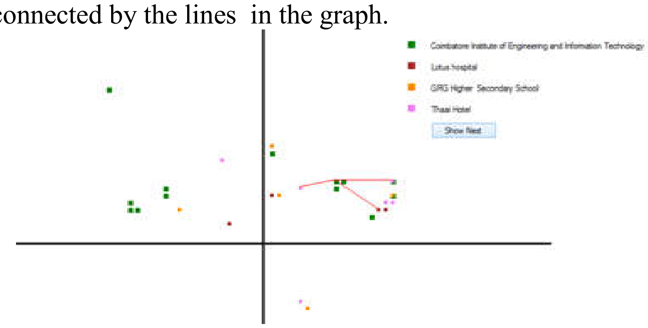

Figure 2. Group Nodes Display

5. CONCLUSION & FUTURE ENHANCEMENTS

The Group Nearest Group Query retrieves number of objects from Query keyword Q with minimum sum of distances to its nearest Data points. Exhaustive hierarchical combination and subset hierarchical refinement algorithm, prunes the query objects and finally the minimized summed distance is calculated. The number of node accesses is also reduced which reduces the query response time, which exhibits good scalability with the query objects and the number of query keywords. Exhaustive hierarchical combination and hierarchical refinement algorithm provide good scalability and accuracy which is implemented by geographical data sets of Coimbatore. In future plan the time constraint will be introduced to improve the accuracy level, response time and further the data sets of other cities based on their geographical location with its graphical map points of the scale (x, y axis) will be updated to prune the search time of the algorithm.

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