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A Study on Dynamic Skyline Queries

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Abstract: Skyline computation has recently received considerable attention in database community, especially for retrieving set of interesting points from large database i.e., it return a set of points that are not dominated by any other points, which is better than one or more dimensions. Skyline means points that are not dominated by any other points and it is mainly used in database visualization. The progressive methods are used in skyline that can quickly return the initial results without reading the entire database. Dynamic skyline queries handle with the moving objects or it receives an interesting attention in Location based services. This study gives an idea about dynamic skyline query and its various applications. Dynamic skyline queries handle with the moving objects and it reports the data points that are not dominated based on the distance between data points and query points.

Keywords: skyline query, location based service, dynamic skyline, Range based skyline query

1. INTRODUCTION

Skyline operation that filters out set of interesting points from a large set of data points and it return the best points. If any points that are interesting it is not dominated by any other points then searching is done based on the personnel preference of the user. Skyline queries are also called pareto queries in relational database and is useful for expressing user preference. Before the entry of skyline into database management there is a problem called maximum vector problem or Pareto optimum [1].In recent years skyline queries receive an interesting attention in various applications such as multi-preference analysis and decision making. In such application skyline set which contain the most interesting points or best points i.e., it retrieve the points that are not dominated by any other points. In database systems, queries specialized to search for the non-dominated data points are called skyline queries and their corresponding result set is known skyline set. Individual data points in a skyline result set are known as skyline points.

The skyline queries which first address problem in static environment and it later progressively find out for dynamic set. If the user is start moving or query is issued from a dynamic environment in that case it addresses the problem in dynamic environment. It also used in spatial network and all our data's are highly distributed so it addresses the problem in distributed environment. For example, hotel finding scenario which has two criteria minimum distance and cost. Based on the user criteria it retrieve the points that are not dominated by any other points so the skyline query which return the most interesting points. Processing skyline queries over moving objects which has numerous applications, such as object tracking and monitoring, location-aware computing, virtual environments, and computer games [2], [3], [4].

For example, in a taxi dispatching scenario it notify their locations within frequent time interval to the dispatcher. So it help to identify the last location and how much near to the user location etc. The skyline query processing over moving objects has received an interesting attention to numerous applications, such as object tracking and monitoring, location-aware computing, uncertain data stream, virtual environments, computer games, and visualization etc. For example, in a taxi dispatching scenario it notify their locations within frequent

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time interval to the dispatcher. So it help to identify the last location and how much near to the user location etc. Skyline queries touch with many emerging applications and research fields. Besides all this advantage the main problem is skyline query processing and skyline result update are expensive application in database. The main cost is accessing data from storage and CPU cost spends for executing the user given query for dominance check. Search efficiency and update criteria are the two most important performance criteria for skyline query processing and skyline result maintenance.

2. DYNAMIC SKYLINE QUERY

Dynamic query means the query location is continuously changing so that skyline results are change frequently. The efficiency of skyline is computed in terms of accessing the data points and organizing the skyline result. Below section which describe set of technique used in different areas.

2.1 Range based skyline query

Range based skyline query [5] in mobile environment which uses two algorithm I-SKY [5] and N-SKY [5]. I-SKY is mainly used static object and N-SKY is focus for dynamic object. Skyline query used with Location Based Service (LBS) [5] which receive an interesting attention in research field and LBS which provides timely information to the user. Range based skyline query which consider both spatial and non-spatial attribute of the object and if the object moves continuously or change location frequently then we use incremental I-SKY and N-SKY algorithm. In range based skyline query it consider user input query as a range, I-SKY algorithm is based on the Skyline scope index calculation and if object moves frequently the maintenance cost is very high so for a large data set it uses N-SKY algorithm. In Spatial skyline queries which handles both static and dynamic query points for static objects it introduce two algorithms B2S2 [6] and VS2 [6] and for dynamic objects use VCS2 [6]. In VCS2 [6] it update the location based on the dominance check and it effectively update the points.

2.2 Dynamic Skyline Queries in Large Graphs

A dynamic skyline query which report all points that are not dominated by any other points and it is calculated based on the distance between data point and query point. Dynamic Skyline query in graph (DSG) which receives an attractive attention and it find out by using some pruning techniques. In graph shortest distance is used to measure distance between two vertices rather than using Euclidean distance. Dist (v,q) which indicate the distance between vertices and query point. For a DSG [7] query which mainly has two challenges (i) handle with huge search space (ii) expensive calculation to find the shortest path computation. Shared Shortest path pruning technique is used to exploit unnecessary path. DSG [7] which uses filter and refine framework to handle the dynamic skyline query and during the filtering process it prune all the points that are dominated by some other points and generate set of candidate vertices by perform BNL algorithm and it generate skyline result set. In refinement phase it exploit the expensive computing of SSP algorithm by using a recursive distance calculation between query point and data point i.e., dist (v,q). Three algorithms are used in road network to find out skyline points they are EDC, LBC and CE, where EDC and LBC which cannot used in DGS-Graph and is based on Euclidean distance calculation. The CE is not efficient and it generates unnecessary skyline computation.

2.3 Dynamic Skyline Queries in Metric Spaces

Metric skyline query which is used to find out the dynamic attribute in the metric space and it has many applications in business plan, multi-decision making etc. In metric space it uses an efficient pruning technique to calculate points that are not dominated by any points i.e., dynamic attributes. All the points are indexed by using an M-tree and dynamic attribute of the data objects is calculated by using set of dimension function. Euclidean distance is mainly considered as the set of dimension function and in road network shortest distance between two vertices is considered as metric distance function. Triangle based pruning which uses the triangle inequality for answering metric skyline queries and it use M-tree to reduce the computational expensive. The optimization techniques used are dynamic indexing and k-diversion to reduce

dominance check and distance computation. Dynamic indexing organizes computed MSS to bucket point which is quickly pruned if they are dominated by another point. K-dispersion which is used for distance estimation the other method used to eliminate the distance calculation by using triangle inequality and known pairwise distance between query points. The MSS[8] queries are effectively processed by using two algorithms they are N^2RS[8] it search entire database twice one for NN and other for range query and B^2MS^2[8] which return the first MSS point without having to read entire database here pruning is based on triangle inequality.

2.4 Continuous Skyline Queries for Multi-Dimensional Moving Objects

A continuous skyline queries which help to find out set of d-dimensional moving object points, which is not dominated by any other points in space. Continuous skyline query in multi-dimensional and dynamic environment is efficiently computed by using a grid based progressive algorithm called C-sky [9]. In C-sky algorithm search order is imposed on the grid cell to avoid the unnecessary cell visit. This algorithm mainly perform three operations (i) Block-Nested Loop algorithm to compute the Skyline points(ii)pruning method is used to remove unnecessary computation of the cell.(iii)merge operation is used to combine the skyline result. Grid index is used in C-sky to represent the moving objects and each skyline point can be independently and locally computed for each cells. C-sky algorithm computes points that are not dominated by any other points from a multi-dimension. It receives periodic updates from the moving object in order to maintain the skyline result set correctly. The main advantage is it use a activity circle to find out the moving objects so it has good processing time but the main disadvantage is has high periodic update cost. The disadvantage of C-sky algorithm is improved by using Lazy update it uses some pruning operation based on the search order list. We use an activity circle for all the moving objects. These are some area in which dynamic skyline query are used.

CONCLUSION

For last decades skyline query processing which receives an interesting attention in data mining field. Skyline queries retrieve the non-dominated points from a large database system based on the user preference so it can be used in preference based applications. It successfully eliminates all the dominated points by using some efficient technique. This paper discusses main application of dynamic skyline query with their proposed algorithms. Skyline query has been applied over both centralized and distributed system is discussed in recent years. Now research opens its area to discuss the dynamic skyline query in different fields.

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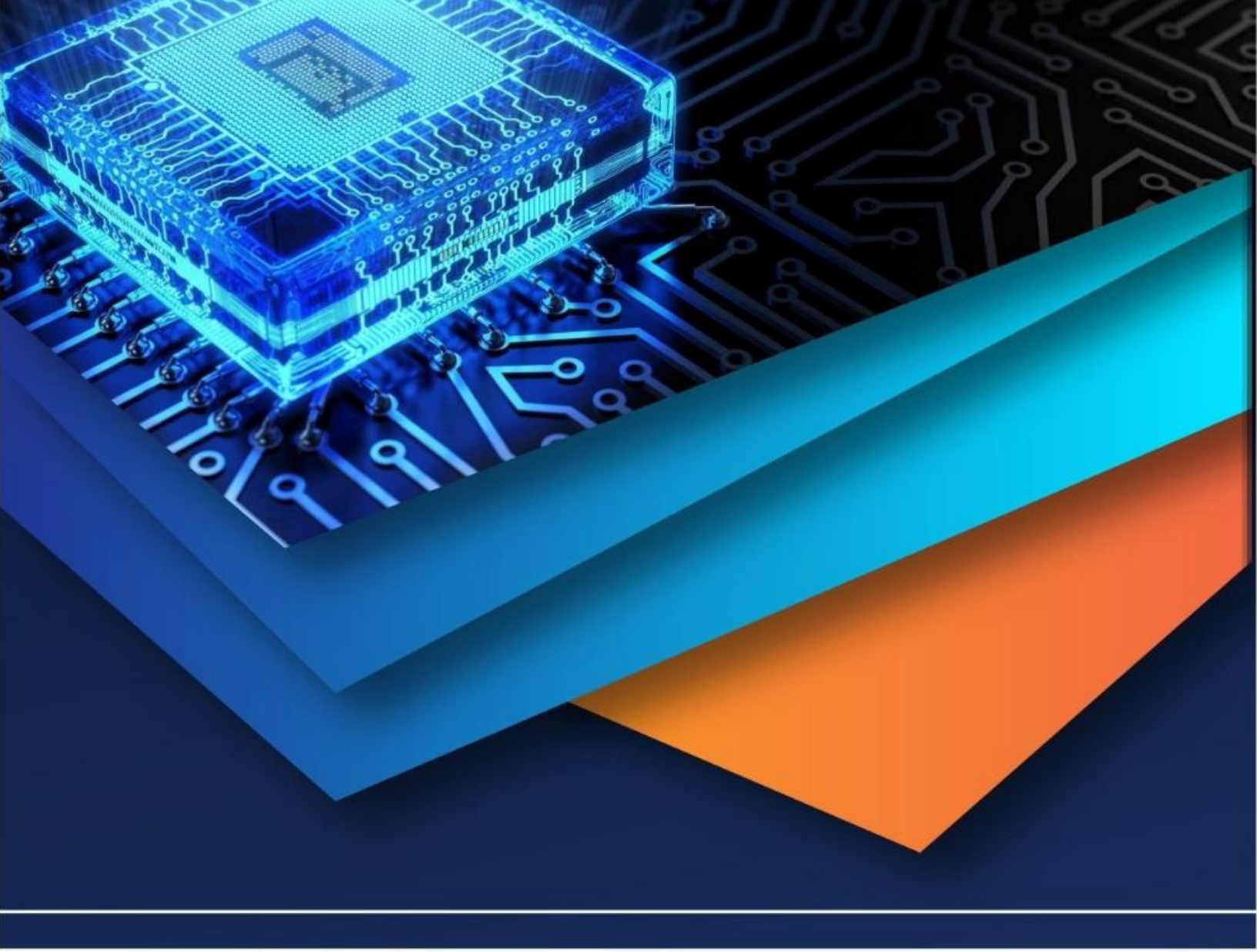

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