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Development of Efficient Skyline Query Processing in Mobile Environment

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***Abstract* — Recently, there has been much interest in processing skyline queries for various applications that include decision making, personalized services, and search pruning. Skyline queries aim to prune a search space of large numbers of multidimensional data items to a small set of interesting items by eliminating items that are dominated by others. Skyline query processing has received considerable attention from database and information retrieval research communities. This paper addresses the problem of answering skyline query processing in mobile environment efficiently. This paper shows how to efficiently perform skyline query processing in a distributed mobile environment and propose a location-dependent skyline processing approach.**

***Key Words* — Skyline Query processing, index based algorithm.**

I. INTRODUCTION

In recent years, there is an increasing demand of personalized web services and cloud computing applications. Many providers are competing for the similar services. Users demand the quality of service (QoS) in making their selection of the service. How to select an appropriate or the best service from many alternative offerings becomes a major concern from the vast user communities. In another front, the dynamically of web service environment poses a challenge to the efficiency of QoS-based service selection.

Skyline Query Processing:

A skyline query is a powerful tool for multicriteria data analysis, data mining, and decision making. Given a set of data tuples with multiple attributes, a skyline query retrieves a set of data tuples, called skyline tuples, to form a skyline. These skyline tuples are not dominated by any other tuples. Here a tuple p is said to dominate another tuple q if p is not worse than q on all attributes and p is strictly better than q on at least one attribute. The skyline tuples are considered to be important because they exhibit the following properties:

- Nondominance: Skyline tuples are not dominated by any tuple outside the skyline set.
- Incomparability: Skyline tuples do not dominate each other, i.e., they hold on to their own ground/ importance in skyline against each other.
- Coverage: All together, the skyline tuples dominate all the nonskyline tuples, i.e., each nonskyline tuple is dominated by at least one skyline tuple.

The skyline query, aiming at identifying a set of skyline tuples that are not dominated by any other tuple, is particularly useful for multi-criteria data analysis and decision making. Skyline queries can be found in a wide spectrum of optimization applications. In line with the numerous electronics manufacturers producing new mobile devices such as smart phones and smart tablets, various mobile services are being provided as applications for these. Accordingly there are more than 200,000 Android and 300,000 iPhone application numbers are increasing rapidly. Nowadays, mobile devices such as cell phones, smartphones, tablets, etc. are rapidly spreading and becoming an important part of human life. Thus, new emerging skyline query processing for mobile conception is a promising solution for effective and convenient multicriteria data analysis ,data mining and decision making in mobile environment. The rapid development of Skyline queries in mobile environment becomes a powerful trend in the development of multicriteria data analysis as well as data mining and industries. However, there are still a lot of challenges for mobile devices performance such as battery life, storage capacity, processing power and secure communication capability. Quality of service significantly limited by lack of available resources.

The smartphones which are equipped with high performance processors, memory, sensors and storage, have achieved great development in terms of hardware resources in the past few years. So there is great need for Skyline Query Processing in Mobile Environment. This paper provides various existing methods to improve performance of Skyline Query Processing in Mobile Environment. And also present the propose method to improve performance by increasing network throughput.

II. BACKGROUND

As the usage of mobile become the necessity of this electronic era. Hence the need for Quality of Service (QoS) is needed in mobile environment as wide applications are available for the same utility and we need the best. So this paper presents the method for efficient Skyline Processing in mobile environment.

A Mobile System (MS) is a distributed system based on PCS or GSM.A set of general purpose computers (PCs, workstations, etc.) are interconnected through a high-speed wired network, which are categorized into Fixed Hosts (FH) and Base Stations (BS). One or more BSs are connected with a BS Controller (BSC), which coordinates the operations of BSs using its own software program when commanded by the Mobile Switching Center. All FDSs form a distributed system to support the global Mobile Query processing.

III. Previous Work Done

Xin Lin et al.[1] had proposed Index and Non-Index based algorithm for Skyline queries.

Jianliang Xu et al.[2] had proposed propose a basic LASQ authentication method in both fixed subspace and arbitrary subspace.

Xiaofeng Ding et al.[3] present a framework for distributed query processing.

George Trimponias et al.[4] proposes a general solution for vertical decompositions of arbitrary dimensionality by introducing vertical partition skyline.

Yu-Ling Hsueh et al.[5] introduces a cache-based framework, called CSS, for reducing the query processing time to support high-responsive applications.

Guoren Wang et al.[6] proposed a skyband-based approach to tackle the problem of reverse skyline query answering over wireless sensor networks

Lijiang Chen et al.[7] PaDSkyline for parallel skyline query processing among partitioned site groups.

Xingjie Liu et al.[8] propose a new uncertain skyline query, called U-Skyline query.

Ken C.K. Lee et al.[9] presents two index-based approaches, namely, augmented R-tree and dominance diagram.

IV. Existing Methodology

- I-SKY indexes the skyline scopes, which accelerates the processing of range-based skyline queries. It includes the index Construction and Query Processing. But unnecessary index updating operations on the skyline Scopes will cause problems.
- N-SKY algorithms first reduce RSQ to SSQs and then processes through SSQ algorithms.
- A basic LASQ authentication method it starts authentication with the authentication problem in a fixed subspace, and then extend it to arbitrary subspaces.
- A general strategy in distributed query processing is to first answer the query within each local site individually, and then combine the results to get the final answer set. It presents a general framework for processing skyline queries.
- Based on the data model and the general processing framework, paper proposes the DSUD algorithm and also an enhanced version of DSUD processing algorithm partition algorithm divides all relevant sites into groups such that a given query can be executed in parallel among all those site groups.
- Based on the discussion so far, an overall parallel distributed skyline algorithm, called PaDSkyline is developed.
- U-Skyline processing algorithms was developed for uncertain databases dynamic programming algorithm to obtain U-Skyline from uncertain data sets, and then improve this algorithm with pruning and early termination techniques to avoid unnecessary computation.
- Two index-based approaches, namely, augmented R-tree and dominance diagram. Augmented R-tree extends R-tree by including aggregated nonspatial attributes in index nodes to enable dominance checks during index traversal.

Dominance diagram is a solution-based approach, by which each object is associated with a precomputed Nondominance scope wherein query points should have the corresponding object not locationally dominated by any other. Dominance diagram enables skyline queries to be evaluated via parallel and independent comparisons between Nondominance scopes and query points, providing very high search efficiency.

V. Analysis and Discussion

Analysis of Existing Methods

Index based and not depending on any index algorithms i.e. I-SKY and N-SKY outperform than the existing line-based skyline solution in terms of both the
CPU time and I/O cost.Partial-S4-tree method outperforms the basic authentication method by up to 69% in terms of the overall query latency and up to 74% in terms of the VO size. Probabilistic R-tree techniques can process skyline queries over distributed uncertain data both communication- and computation-effectively. Reverse Skyline, range reverse skyline and multiple reverse skylines, These proposed approaches can achieve robust query performance with respect to various parameters, and they are energy efficient to be carried out in WSNS.

VI. Proposed Methodology

This paper proposes improved methods of dealing with Skyline query in mobile environment. This method is improved version of range based Skyline Query Processing in Mobile environment. This method is combination of I-sky and N-SKY algorithm. This method is called as IAN-SKY.

IAN-SKY method is a combination of both the Index based and non index based algorithm i.e.it uses Index based I-SKY only when it does not imposes any cost. Otherwise it will use N-SKY algorithm.

Construction of skyline scope index
1. for each object o 2 O do
2. compute its non-spatial dominator objects Dom(o);
3. if Domðoþ ¼ ; then
4. SS(o) = the whole space;
5. else
6. SS(o) = o's Voronoi cell in fog [Domðoþ;
7. build an MX-CIF quad tree over the skyline scopes of all objects; For performing skyline query through Index based, first we need to construct skyline scope and then perform query computation.

While in Non Index based Skyline query processing there is no need to compute index which minimises the cost for computing very large index.

VII. EXPECTED PERFORMANCE

Expected results are that the proposed algorithms well outperform the baseline algorithm that adopts the existing line-based skyline solution.

CONCLUSION

This paper has presented a skyline query as an extension to point- and line-based skyline queries. This paper has proposed index-based (I-SKY) and nonindex (N-SKY) solutions to resolve the skyline query processing problem in mobile environment. To handle the movement of the objects being queried, the incremental construction of the I-SKY index has also been devised.

FUTURE SCOPE

Additionally, this have extended the skyline query concept to the continuous domain, and developed query processing algorithms for static and moving objects in mobile environment.

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