Big Data Systems (Winter, 2023) - Course Project Proposal

University of New Brunswick, Fredericton, Faculty of Computer Science

Implementation of OSS, ORD and ORU Skyline operators (Java) assignment

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Motivation

Skyline queries have become increasingly important in many applications such as spatial data, decision-making processes, and recommendation systems. Skyline operators such as OSS, ORD, and ORU provide different ways to compute skyline queries. The motivation behind this project is to implement these operators in Java to explore their functionalities and capabilities in retrieving the most relevant data. This process will be facilitated using paper[1].

Problem Statement

The aim of this project is to implement the OSS, ORD, and ORU Skyline operators in Java using existing C++ code. Our implementation will support various operations such as search, insert, and update on them. Additionally, we plan to compare the performance of these operators against existing approaches.

Approach

To achieve the above-stated objectives, we will take the following approach:

1. Study the existing C++ code for the OSS, ORD, and ORU Skyline operators to understand their concepts and functionalities.
2. Develop a Java implementation of the Skyline operators using the existing C++ code as a reference.
3. Test and debug the Java implementation to ensure correctness.
4. Implement operations such as search, insert, and update on the Java implementation of the Skyline operators.
5. Evaluate the performance of the Java implementation against the existing C++ implementation and other existing approaches.
6. Analyze the advantages and challenges of OSS, ORD, and ORU Skyline operators in Java.

Milestones

The following milestones will be achieved to complete the project:

1. Study the existing C++ code and write a project proposal (March 1).
2. Develop the Java implementation of the Skyline operators using the existing C++ code as a reference. (March 8)
3. Test and debug the Java implementation to ensure correctness. (March 20)
4. Write the progress report (March 22)
5. Test our prototype with different use cases (March 31)
6. Conduct performance evaluation (April 10)
7. Show a Demo of the project (April 15)
8. Consolidate our study in a Project report (April 22)

References

[1]Kyriakos Mouratidis et al. Marrying Top-k with Skyline Queries: Relaxing the Preference Input while Producing Output of Controllable Size. SIGMOD 2021