Title

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Abstract—**This research proposes an advanced approach that improves the efficiency of skyline query processing by significantly reducing the computational cost on object comparisons, i.e., dominance tests between objects.**

I. INTRODUCTION

Given a set of objects in a d-dimensional space, the skyline query returns objects that are not dominated by any other objects in the object set [1].

Skyline queries have been used as convenient means for multi-criteria decision-making since their introduction to database community. An example of a skyline query over hotels in a 2-dimensional space is illustrated in Fig. 1. In the example, the query takes the price and the distance from hotel to beach into account, and returns hotels {a, e, h, i, j} as skyline objects because there does not exist any hotel that is either cheaper (with the same distance), closer to the beach (with the same price), or better in both dimensions.

II. MBR-ORIENTED APPROACH

A. Framework Overview

Skyline queries are evaluated in three steps in our solutions.

III. CARDINALITY ESTIMATION

We provide an estimation of the cardinality of skyline query and dependent group of MBRs in this section.

A. Cardinality of Skyline Query over MBRs

1) Discrete Data Space: Given a discrete data space $\mathbb{R}^d = [0, n^i)^d$, where n^i indicates the upper bound of the data space in the ith dimension. The attribute values of objects under a uniform data distribution are evenly distributed across the data space in each dimension.

IV. EXPERIMENTAL VALIDATION

In this section, we evaluate the performance of the proposed skyline solutions over both synthetic and real-world datasets.

V. RELATED WORK

A. Skyline Query

The skyline query, also known as maximal vector computation [2], was first introduced in database management system by [1].

VI. CONCLUSION

We propose two advanced skyline solutions utilizing novel concepts of skyline query and dependent groups over MBRs for minimizing the cost of dominance test.

REFERENCES

[1] S. Börzsönyi, D. Kossmann, and K. Stocker. The Skyline Operator. In *ICDE*, pages 421–430, 2001.

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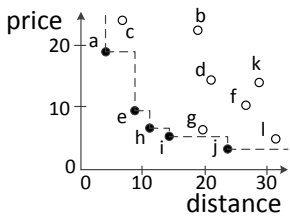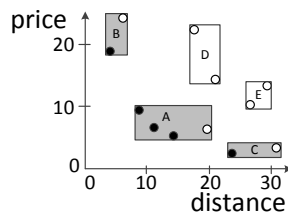
Fig. 1. A skyline query over hotels.

Fig. 2. A skyline query over MBRs. A, B, C, D, and E indicate five MBRs.