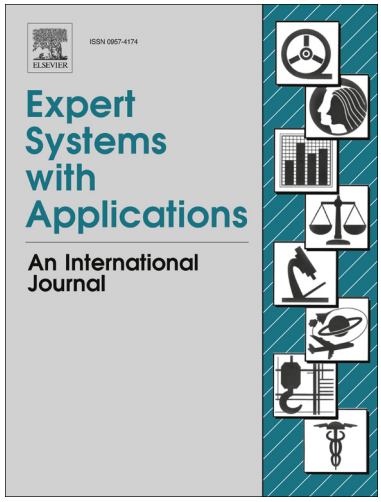

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On Efficient Reverse Skyline Query Processing

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Abstract: Given a *D*-dimensional data set *P* and a query point *q*, a *reverse skyline query* (RSQ) returns all the data objects in *P* whose dynamic skyline contains *q*. It is important for many real life applications such as business planning and environmental monitoring. Currently, the state-of-the-art algorithm for answering the RSQ is the *reverse skyline using skyline approximations* (RSSA) algorithm, which is based on the precomputed approximations of the skylines. Although RSSA has some desirable features, e.g., applicability to arbitrary data distributions and dimensions, it needs for *multiple accesses* of the same nodes, incurring *redundant* I/O and CPU costs. In this paper, we propose several efficient algorithms for *exact* RSQ processing over *multidimensional* datasets. Our methods utilize a conventional data-partitioning index (e.g., R-tree) on the dataset *P*, and employ *precomputation*, *reuse*, and *pruning* techniques to boost the query performance. In addition, we extend our techniques to tackle a natural variant of the RSQ, i.e., *constrained reverse skyline query* (CRSQ), which retrieves the reverse skyline inside a specified *constrained region*. Extensive experimental evaluation using both real and synthetic datasets demonstrates that our proposed algorithms *outperform* RSSA by *several orders of magnitude* under all experimental settings.

Keywords: Skyline; Reverse Skyline; Constrained Reverse Skyline; Query Processing; Algorithm

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