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Abstract

The skyline query, aiming at identifying a set of skyline tuples that are not dominated by any other tuple, is particularly useful for multicriteria data analysis and decision making. For uncertain, a probabilistic skyline query, called P-Skyline, has been developed to return skyline tuples by specifying a probability threshold. However, the answer obtained via a P-Skyline query usually includes skyline tuples undesirably dominating each other when a small threshold is specified; or it may contain much fewer skyline tuples if a larger threshold is employed. To address this concern, a new uncertain skyline location based query has been proposed, called U-Prefix Scan query. Instead of setting a probabilistic threshold to qualify each skyline tuple independently, the U-Prefix Scan query searches for a set of tuples that has the highest probability (aggregated from all possible scenarios) as the skyline answer. In order to answer U-Prefix scan queries efficiently, a number of optimization techniques for query processing, including 1) Computational simplification of K-NN for neighbor node prediction with U-Prefix Scan probability, 2) Pruning of unqualified candidate skylines and early termination of query processing, 3) Reduction of the input data set, and 4) Partition and conquest of the reduced data set. A comprehensive performance evaluation on their algorithm and an alternative approach that formulates the K-NN with U-Prefix scan Skyline processing problem by integer programming.

Keywords

Skyline Processing, Uncertain Data, Data Set, Big Data