Compact Representations for Shortest-Path Queries

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The paradigm of computing geometric summaries has recently emerged as a powerful tool for developing fast approximation algorithms for geometric optimization problems. For a given tolerance, the technique computes a "core" subset of the input points that approximates an underlying measure of the whole set. It is shown that for a wide range of interesting measures, the size of the summary depends upon the approximation error and possibly on some geometric complexity of the input but is independent of the combinatorial description of the input set, and that such a "compact" summary can be computed efficiently. This talk discusses some recent results on this approach in the context of shortest-path queries and a few open problems.