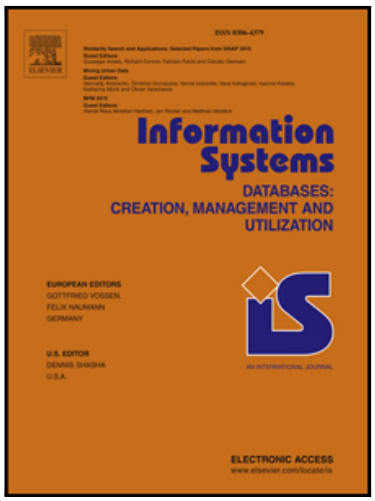

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Efficient Processing of Shortest Path Queries in Evolving Graph Sequences

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Abstract

In many applications, information is best represented as graphs. In a dynamic world, information changes and so the graphs representing the information evolve with time. We propose that historical graph-structured data be maintained for analytical processing. We call a historical evolving graph sequence an EGS. We observe that in many applications, graphs of an EGS are large and numerous, and they often exhibit much redundancy among them. We study the problem of efficient shortest path query processing on an EGS and put forward a solution framework called FVF. Two algorithms, namely, FVF-F and FVF-H, are proposed. While the FVF-F algorithm works on a sequence of flat graph clusters, the FVF-H algorithm works on a hierarchy of such clusters. Through extensive experiments on both real and synthetic datasets, we show that our FVF framework is highly efficient in shortest query processing on EGSs. Comparing FVF-F and FVF-H, the latter gives a larger speedup, is more flexible in terms of memory requirements, and is far less sensitive to parameter values.

Keywords: Evolving Graph Sequeces, Shortest Paths, Social Networking

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