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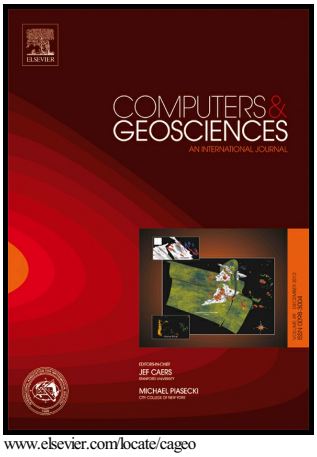

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Formalization and Web-based implementation of Spatial Data Fusion

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Abstract

Spatial data fusion plays an important role for spatial information retrieval from disconnected data sources and is thus a precondition for comprehensive and consistent decision making. In particular on the Web, it can help to combine spatial data from the variety of existing, but distributed sources, e.g. as provided by Spatial Data Infrastructures (SDIs). However, standardized spatial data processing on the Web still lacks broad acceptance beyond the scientific domain. This article describes a formalization and service-based implementation of the spatial data fusion process. The formalization builds on a set theoretic description of the considered domain and derives a number of possible fusion objectives. Geoprocessing patterns are used to describe commonly used sub-routines of the fusion process and therefore support the workflow composition. The implementation is based on open standards and comprises a Web-client, several geoprocessing services and a fusion engine to support the Web-based compilation and execution of spatial data fusion workflows in an ad hoc manner.

Keywords: Data fusion, Set Theory, Spatial Data Infrastructure, Service Composition, Geoprocessing pattern

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1. Introduction

The amount of spatial data on the Web, offered by governmental, volunteered, scientific and corporate initiatives, continuously grows and holds great potential for comprehensive spatial decision making. However, while

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