

Two methods to compute topology in raster images for cartographic generalization

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Abstract

In GIS-analysis there is often a need to filter out unwanted details, such as small areas. In those cases the deletion generalization operator has proved to be useful. To provide base facts, when to perform this operator, we need to establish the topological relations in the database when we are working with raster data.

In vector-based GIS topological relations are stored explicitly together with the data. In raster based systems the topological relations are implicit in the data, but methods are required to bring out the relations explicitly. A related issue is how to store the topological relations once they are extracted.

This paper describes two different methods to establish topological relation in a segmented raster data base. Both methods are based on image processing techniques. The first method is a local operator that works on one raster object at the time. The topological relations are stored in a relational table. The second method is based on a newly developed edge cross filter that performs the processing globally. The result is stored as an image or as a relational table.

The pros and cons of both methods are discussed. In an example it is shown how these methods are used to analyse digital cartographic data in an object oriented raster base and to perform generalization of small objects that are selected based on their topological relations.