Exploratory Construction of Generalisation Rules for Landuse Vector Data Generalisation

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Abstract

Landuse vector data generalisation is to derive a new landuse dataset or map from an initial dataset by removing the minor details. The generalised results should delineate the dominant landuse characteristics of important landuse types in a reduced map space or a theme-specific application. The generalisation process are guided and controlled by a set of generalisation rules serving for the reduced scale or specific theme.

Traditionally, the variables or thresholds involved in generalisation rules are determined by cartographic experts or operators and generally kept no change in the whole underlying area. A little attention is paid to explore landuse characteristics from a dataset itself before setting generalisation rules. The rules, therefore, might not comply well with the geographic realities described by the dataset, and the diverse geographic characteristics are scraped after landuse data generalisation.

This paper aims to explore landuse characteristics from landuse datasets for constructing generalisation rules in order to make them adaptable to the different geographic areas. The first step is to identify the dominant landuse types in a reduced scale or related to a specific theme. Two approaches are combined in the step, multi-criteria decision analysis and spatial association analysis. Multi-criteria decision analysis takes account of 4 factors, area ratio, ratio of patch number, theme-relevant degree and economic value of each landuse type, to determine the importance of each landuse type from spatial, application-based and economic aspects, respectively. Afterward, spatial association analysis explores the associated relationship between land patches of different landuse types. It may discover possible patterns specially consisting of several landuse types. The special patterns may adjust the importance of concerned landuse types. The result of the two analysis actions derives an importance rank of landuse types. The importance rank is sequentially involved in determining the minimum map units (MMU) whish is used to detect conflict landuse patches for data generalisation. Beside MMU, other spatial characteristics are also helpful to

identify conflict patches and guide the selection of operators, such as shape of patch, patch density, similarity degree of different patches. Several landscape indices are employed and adjusted some variables fitting the context necessary of landuse data generalisation.

Landuse characteristics acquired from the above exploration approaches are used to construct generalisation rules which guide a test of landuse data generalisation with a real landuse dataset. The result shows that the exploration of landuse characteristics from datasets is a more effective and reasonable way to construct generalisation rules than the traditional way for representing the important characteristics after generalisation.