Working Environment Construction for Interactive Map Generalization System

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Cartographic generalization includes automatic process, interactive process and on-the-fly process. Interactive generalization which involves both manual decision and computer performance is thought of as a practical solution when generalization process can not reach automatic level currently. Usually manual decision in interactive procedure contains context analysis, operator selection, algorithm choice, parameter set and result evaluation, while computer performs low-level concrete geometrical computation. More and more GIS software and mapping system begin to add generalization operation which is usually reflected as a graphic edit command with some interactive tuning arguments, such as line simplification. This method is lack of an efficient and complete work interface between user and computer, without consideration of two different work roles and their relationship. Interactive generalization between user and computer in a limited screen needs some special strategies enabling user makes generalization oriented decision. The strategies include such as multi-scale visualization, generalization ruler tuning, generalized result comparison with the original, etc., The digital data is scale independent in database generalization, but the user can make decisions only when the data is displayed in an efficient visualization environment.

Based on a practical system design, this paper will discuss some issues of working environment construction for interactive map generalization, including the following contents:

1> Generalization oriented data organization, including separation of base layer and generalization layer. The generalization is reflected as a data layer deriving from base layer, in which deletion, simplification, aggregation operations perform. Only the data copied to generalization layer can be executed generalization operation. The strategy enables user compare the generalized result with the original when two corresponding layers are both displayed .

2> Multi-scale visualization and various compounds. There exist four kinds of visualization schema in system interface: base layer displayed in original scale, generalization layer displayed in original scale, base layer displayed in destination scale, generalization layer displayed in destination scale. Different visualization compounds enable user to judge geometrical location error, shape distortion, distribution change and spatial conflicts between generalized results.

3>Generalization ruler construction and tuning. Based on sum-up of all kinds of generalization rulers, a six-tuple description is given,

(layer, feature code, operator, index parameter, from-value, to-value)
A message box is provided for user to adjust generalization rule index.

4>Generalization log recorder and undo operation. Manual decision in generalization process is a step of try-undo-correct, requiring a strategy to record every step of operation. A stack of operating object and behaviors is applied in generalization log history .

5>Presentation of some comparison measure tools to assist decision making. Some computation tools such as measure of distribution density, Hausdorf distance, etc are provided to judge generalization effects.

Topic 8   "Map Design and Production"