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COMPLEXITY TRANSFORMATION FOR AN INDIVIDUAL LINEAR FEATURE IN DIFFERENT SCALES TOPOGRAPHIC MAPS

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Cartographic generalization is the method whereby information is selected as represented on a map in a way that adapts to the scale of the display medium of the map. In the way, not all intricate geographical are preserved. In order to create a suitable and useful map to convey as much information as possible to users, the cartographers have to adjust the content within their maps so that strike the right balance between the map's purpose and actuality of the reality.

Well generalized maps are those that emphasize the most important map features while still representing the world in the most faithful and recognizable way. The level of detail and important in what is remaining on the map must outweigh the insignificance of items that were generalized.

On a map, over 80% of features are line features. Every feature has its own complexity. Usually, more complex feature has more information. Different line features has different importance. When doing map generalization, the less important features are deleted, and the features with more importance are retained. In the retained feature part, some line features are simplified and some ones have no change. Which features can be retained? And how the complexity is simplified? Therefore, the objective of this study is to find out the transformation of complexity in an individual linear feature in different scales maps.

There are some methods to measure the complexity, such as fractal dimension, entropy. Fractal dimension measures the complexity from space filled aspect. Entropy measures the complexity from diversity aspect. In this work, both these two methods will be used to quantitatively measure the complexity of features in a map. With the values, the complexity of a feature is shown obviously.

Some existing topographic maps with different scales will be used to estimate the transformation of the complexities of linear features. In topographic maps, there are several categories of line features, i.e. road, contour line, river. For different categories, the levels of importance are different. Therefore, in this case, the linear features will be analysed in every category.

For every category, the complexity of more than 100 samplings will be calculated. With these values, it can be found which level of importance of features will be retained when one scale map is generalized to another scale map. Then, all the complexity values of the sample which is retained in all scale maps will be analysed by regression analysis and the slope coefficient will be regarded as the transform factor for a sample. Then, the average of transform factor of all samples will be as the complexity transform value of a category features.

Finally, a new rule for transformation of individual feature in different scale maps will be given. With this rule, cartographers can easily decide which feature should be retained when generalize maps. It also can be used to control the quality of generalized map.