Standard Map Data for Evaluating Automatic Map Recognition System

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Recently many people get interested in GIS and there are many research activities on the development of GIS. In introducing GIS the cost of preparing digital map data is one of the most important factors to consider.

In order to get digital map information less expensively and more rapidly, we made research on automatic map recognition. The research consists of two stages. The first stage is the development of recognition system and the second is the development of standard map data for the evaluating recognition system.

1. Development of Recognition System

In order to develop automatic map recognition system, we adopted three different approaches:
(1) To analyze the geometrical and topological characteristic of each pattern and to recognize symbols of a map. This is an orthodox method.
(2) To apply expert system technique: Separating cognitive knowledge for each map from inference engine for recognition;
(3) To apply neural network technique.
Each approach has advantages and disadvantages, and none of them achieved perfect recognition. We would like to show the result of each method.

2. Development of Standard Map Data for the Evaluation of Recognition System

A lot of map recognition systems have been developed and the ability of these systems are shown on catalogues. But there have not come to be objective method to evaluate map recognition systems. Some systems are powerful for symbol recognition and others are advantageous to line data extraction.

We developed the evaluation system of map recognition systems. The evaluation system consists of three components.
(1) Standard raster map data which is a series of raster data prepared for automatic recognition. The scale of original maps is 1/2,500 and 1/25,000. Paper maps were scanned to produce raster data.
(2) Vector data which is generated from the standard raster map data. This vector data is sufficiently accurate and used as reference vector data.
(3) A set of Evaluation program which compares the result of automatic recognition of standard raster map data with the vector data described above (2). The key point of evaluation is as follows:

a) Geometrical accuracy
b) Item identification

We will report the results of the evaluation which is applied to several map recognition systems.