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Background

A current concern is the monitoring of land-cover that may be carried out by analysing the changes between the last remote sensing data and results from previous studies. The detected changes may be caused either by real territory evolution or by classification errors. At this moment, the Institut Cartogràfic de Catalunya has three previous land-use studies at 1:250,000 scale as products of classification of satellite images acquired in 82, 87 and 92. In addition, Land-cover data base generators should also take under consideration collateral information from other sources different from satellite imagery such as agriculture studies, the CORINE study, topographic layouts, and climatic data.

Nowadays, many tools may contribute to a land-cover data base development. First, geographic information systems might provide the supporting collateral data. Second, expert systems can handle the heuristic rules which represent the relationship between land cover and its supporting data. Finally, remote sensing gives the most recent information on the territory.

System description

The change analyser can help in different project phases such as supervised classification and the revision of the final product quality. In the classification stage, the analyser can reinsure a candidate label obtained by training. During the quality revision task, it would be very helpful for the operator to be guided by supporting data ordered by their revision severity degree.

Another important characteristic of the system is its global application since the logic of the system and its methodology can be extended to any geographic areas. For instance, if the system is used in a tropical country, the only requirement is to provide some experts on local land cover who would have to fill an easy-structured table of rules for the regional version of the system.

Methodology

1. Knowledge and data acquisition for the land-cover change analyser:
 - 1.1 Comparison among previous studies to help the analysis of the rule-based system
 - 1.2 Definition of the object-oriented structure of the land cover
 - 1.3 Adjustment of the rules of change to the object-oriented data structure
2. Development of the current land-cover data base:
 - 2.1 Remote-sensing processing for the satellite imagery to obtain a classified image

- 2.2 Supervised classification assisted by the land-cover change analyser
- 2.3 Quality revision of the final product using supporting data which have been ordered by severity degree
3. Feedback of the system behaviour from the local experts

Case Study: Vic, Catalonia

To test the system, the Vic area, located in Catalonia, Spain, was chosen. The knowledge and data acquisition for the analyser were mainly provided by Joaniquet, M., Tardà, A. and Viñas, O. -the thematic experts at the remote-sensing department- and statistics obtained from comparison of the previous studies. The change types defined are event, gradient, and error. The severity degree is based on the area of the polygon and its morphology.