

## **A comparison between the ISODATA and the eCognition classification methods on basis of field data**

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### Abstract

The need for updated thematic layers describing the land cover and use is the first priority for the applications that are dealing with land exploitation and nature preservation. The opportunity to update our knowledge of the land cover and use of an area in a quick, relative inexpensive, comprehensive and extensive way, is provided by the remote sensing products. The precise filtering of the information registered on imageries and the sorting out of the surface objects is carried out with image analysis algorithms. On them relies our capability to automatically recognize similarities and discriminate among different surface objects. Moreover, the detail and success of discrimination that can be achieved by the use of these classification algorithms constitutes one of the limiting factors for the effective usage of remote sensing products.

In this case the ground truth data are available. Furthermore, except of the existing clustering algorithms the opportunity is given to apply, as pilot users, the new innovative classification approach DELPHI 2 eCognition. Parallel to the common classification procedures that are used in our investigations much work has already been done on basis of this new method. As a consequence, the question of the success of this new approach is arisen. Can more precise pattern recognition be achieved and in what scale is the improvement that can be accomplished ? Or are the already known algorithms performing as well ?

In the frame of this topic a comparison is performed between the DELPHI 2 eCognition multiscale networked object oriented classification results and the ISODATA clustering application results.

The ISODATA clustering algorithm compares the radiometric value of each pixel with predefined number of cluster attractors and shifts the cluster mean values in a way that the majority of the pixels belongs to a cluster. The user in this case interacts with the procedure at the beginning indicating the number of the predefined clusters to be created and the iterations to be carried out and at the end, where he decides which class represents which surface objects and merges or rejects the classes with non-realistic representatives.

The DELPHI 2 eCognition software performs a first automatical preprocessing - segmentation- of the imagery. This results to an abstraction of information and a knowledge-free extraction of image objects. The formation of the objects is carried out in a way that an overall homogeneous resolution is kept. The segmentation algorithm does not only rely on the single pixel value, but also on the "color" (pixel value) and spatial continuity. The formatted objects have now not only the value and statistic information of the pixels that they consist. They carry also texture and form information. The user can then interact again with the procedure and based on statistics, texture, form and mutual relations among objects can create classes, where the classification of an object follows either the nearest neighbourhood method or fuzzy membership functions. Multilevel context sensitive segmentation and classification with hierarchy rules are also available.

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The investigated area is under extensive scientific surveillance for precision farming purposes. For this reason, it is of great interest to possess a classifier in order to recognize differences in the vegetation status in a field.