

CLASSIFICATION OF SETTLEMENT AREAS IN REMOTE SENSING IMAGERY USING CONDITIONAL RANDOM FIELDS

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ABSTRACT:

Land cover classification plays a key role for various geo-based applications. Numerous approaches for the classification of settlements in remote sensing imagery have been developed. Most of them assume the features of neighbouring image sites to be conditionally independent. Using spatial context information may enhance classification accuracy, because dependencies of neighbouring areas are taken into account. Conditional Random Fields (CRF) have become popular in the field of pattern recognition for incorporating contextual information because of their ability to model dependencies not only between the class labels of neighbouring image sites, but also between the labels and the image features. In this work we investigate the potential of CRF for the classification of settlements in high resolution satellite imagery. To highlight the power of CRF, tests were carried out using only a minimum set of features and a simple model of context. Experiments were performed on an Ikonos scene of a rural area in Germany. In our experiments, completeness and correctness values of 90% and better could be achieved, the CRF approach was clearly outperforming a standard Maximum-Likelihood-classification based on the same set of features.

TOPIC: Land cover classification

ALTERNATIVE TOPIC: Land cover classification