ABSTRACT

Very high resolution (VHR) satellite images offer a great potential to extract land-cover and land-use related information in urban and suburban areas. We evaluated four VHR urban land-cover classification approaches with mutual reference data on five subsets of a Quickbird image of Ghent (Belgium). The three pixel-based classifiers (Artificial Neural Networks, Dempster – Shafer, Maximum Likelihood) and the region-based classifier (eCognition) yielded similar overall kappa coefficients.

RESULTS, DISCUSSION AND CONCLUSIONS

We can draw the following conclusions about the experiments with the training approaches and the different combinations of classification variables:

- Adding the PAN-band to the four spectral bands substantially increased classification performance.
- Adding window-based texture measures in per-pixel classification slightly increased the classifier’s performance (from 0.79 to 0.83 for the best approach).
- Including a typical pixels in the training phase improved the overall accuracy of the classification with a few percentage points for some classification scenarios.
- The use of 3x3 training blocks did not improve the accuracy of pixel-based classifications.

The result of any pixel-based classification approach is not directly useful for end-users because of shadows, structural clutter and classification errors. Attempts were made to reduce these problems (see poster: “Post-Classification Improvement of Pixel-based Urban Land-Cover Classifications”). In the near future, we will refine the procedures we used here by applying them on study areas in the cities of Brussels and Liège. We also plan to develop Earth-Observation based applications aimed at fulfilling specific user needs, which were defined with an in-depth user survey.

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