Diploma thesis
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Abstract:

Application and evaluation of an object-based classification method for the registration of linear wooden landscape structures in the Muensterland region

An object-based classification procedure was applied to extract linear wooden landscape structures (hedgerows, alleys, tree rows) from a 50 cm-resolution true-color orthophoto. The 1.6 km x 2.0 km study area is situated in the northwest of the town Emsdetten in northern North Rhine-Westphalia. The classification was conducted with the software eCognition Developer 8.0. After segmenting the picture with multiresolution segmentation, a nearest neighbor classifier was applied. For this application, one ratio, one spectral, and three textual features were selected. Using form features and context, the classification was improved afterwards. The classification accuracy was evaluated qualitatively and quantitatively by comparing the classification results to field data and by an onscreen analysis of random points using the orthophoto as a reference. The results showed that 140 out of 146 linear wooden structures mapped in the field were recognized by the classification as *WOODS*, six were not. Two short and dark wooden structures were wrongly classified as shadow. Four young, thin, and light structures with little texture were confused with field represented by the class *OTHERS*. Results from the onscreen analysis were presented in an error matrix. Producer's accuracy of the class *WOODS* was 92 %, user's accuracy 59 %. Classification errors are mainly due to problems with tree shadows, segment shape and composition, as well as artifacts from removal of plane, wooden areas after classification. Nevertheless, the results are satisfying compared to similar studies. The applied classification procedure is suitable for registration of linear wooden structures on a landscape level. Testing the transferability of the developed classification scheme on other aerial pictures with comparable content remains a topic for further research.

Keywords:

Object-based classification, eCognition, producer's accuracy, user's accuracy, linear wooden landscape elements, Muensterland region