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# 3D CLASSIFICATION OF CROSSROADS FROM MULTIPLE AERIAL IMAGES USING MARKOV RANDOM FIELDS

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Abstract. The precise classification and reconstruction of crossroads from multiple aerial images is a challenging problem in remote sensing. We apply the Markov Random Fields (MRF) approach to this problem, a probabilistic model that can be used to consider context in classification. A simple appearance-based model is combined with a probabilistic model of the co-occurrence of class label at neighbouring image sites to distinguish up to 14 different classes that are relevant for scenes containing crossroads. The parameters of these models are learnt from training data. We use multiple overlap aerial images to derive a digital surface model (DSM) and a true orthophoto without moving cars. From the DSM and the orthophoto we derive feature vectors that are used in the classification. One of the features is a car confidence value that is supposed to support the classification when the road surface is occluded by static cars. Our approach is evaluated on a dataset of airborne photos of an urban area by a comparison of the results to reference data. Whereas the method has problems in distinguishing classes having a similar appearance, it is shown to produce promising results if a reduced set of classes is considered, yielding an overall classification accuracy of 74.8%.

Conference Paper (PDF, 627 KB)

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