Unsupervised Segmentation of Naval INfrared Images through a Markov Random Field Model

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Abstract - Ship recognition systems use infrared imaging technology at night or at poor visibility . On the infrared images taken in offshore environments three kinds of regions can be distinguished: ship, sky and sea. For the classification of ships the area in the image covered by the ship contour has to be extracted. The purpose of image segmentation is to partition an image into constituent components for further processing such as recognition . There are two main categories of segmentation algorithms : Supervised and unsupervised . Supervised segmentation can be used where the features are known a priori . These algorithms classify data inputs based on training datasets or on user inputs , while unsupervised segmentation is only based on the features in the current dataset. Because the features are unknown and the procedure should be independent from user interaction to get reproducible results, unsupervised segmentation is chosen . A very effective technique for unsupervised segmentation is clustering . Therefore this paper investigates common clustering algorithms for their suitability. The Markov Random Field Model is found to deliver the best results for segmenting infrared images but also has the highest computational demand .