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Stochastik basierte Segmentierung von Sonarbildern unter Verwendung von Regressionsbäumen.

ABSTRACT - Masterthesis

Stochastic Based Segmentation of Sonar Images Using Regression Trees

In this Master thesis new image segmentation algorithms are developed. At first a stochastic regression tree based approach is investigated. Different probability density functions are examined for modeling the distribution of the underlying SAS image pixel intensities. In the first step an image is partitioned in several rectangular patches where also the integral image approach is used. For reducing the computational costs different stopping rules for building the tree have been defined. Also a new way of pruning the regression trees by using the maximum likelihood pruning has been developed and compared to existing approaches. After partitioning the image in several patches and pruning the tree the elements are labeled as the classes highlight, shadow and background. This is done either by a likelihood ratio test or a region growing approach. For comparing this algorithm a second strategy has been developed by also using integral images and a statistical snake based approach. The developed algorithms have been examined with respect to the possible parameters and compared to the mean shift segmentation. For real time applications the duration of segmenting an image using the different approaches is also compared. To compare the quality of the segmentation methods, special examples with very low contrasting regions are used.