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Unsupervised Image Segmentation and Shape Detection of Target in Side Scan Sonar Images using Statistical Snake-Based Approach.

ABSTRACT - Masterthesis

Snake-based segmentation has been widely used for finding the contours of the objects in side scan sonar images. Techniques to increase the robustness and to obtain fast algorithms for efficient computation time of snake-based technique will be introduced to track the shape of highlight and shadow of the object.

The aim of this thesis is to use statistically independent snake-based image segmentation techniques to detect the shape of highlight and shadow in side scan sonar images for object identification. To achieve this purpose a good segmentation of the image scene and reliable extraction of highlight and shadow is necessary. This technique developed in a Maximum likelihood (ML) approach depends on the calculation of inner and outer regions expressed as exponential laws (Gamma, Gaussian). The segmentation technique is used to separate the scene into regions described by the probability density function to drive the snake to fit the maximum of an edge map of the image scene. An energy term will be used to constrain the shape of the object.

During the simulation procedure, simulations with real images will be carried out to analyze and compare the algorithms.