

Master 2006

Jianshu Zhang

Unsupervised Image Segmentation and Pattern Recognition for Sonar Images

*ABSTRACT - Masterthesis*

Generally, side scan sonar images are assumed to be a noisy version of a true label field. Our aim is to use statistical based image segmentation techniques to reconstruct the true label field by associating a label to each image pixel.

To achieve this purpose we are going to present two unsupervised techniques. One is stochastic model-based image segmentation. In this approach, the problem is formulated as a problem of parameter estimation from incomplete data, and the expectation maximization (EM) algorithm is used to determine a maximum-likelihood (ML) estimate. The other one represents a statistical region based snake theory. Here, the snake is a window function driven to fit the maximum of an edge map of the scene, and finally we get the segmentation of an object in an image.

During the simulation procedure, simulations with synthetic and real images have been carried out to analyze and compare these two techniques. The results show that both EM estimation-segmentation method and snake algorithm work properly for our application.