

New Methods for Segmentation and Image Differentiation

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The aim of this lecture is to present methods for the classification of textures, locating extraneous objects within textures and segmentation of still and movie images. The discrimination algorithms are based on higher order statistics, the analysis of corresponding scatter plots and the clustering of high dimensional data.

The segmentation algorithm is a two step process. The image is initially divided up into regions and those regions containing objects different from the texture background are identified. The boundaries of the objects are determined in the second step. Here one makes use of a hidden Markov model to construct certain graphs which enable one to identify the boundary.

Our general approach of utilizing local statistics has the advantage of eliminating large portions of the image in the first iteration, and therefore it is not necessary to examine each individual pixel which is common in segmentation algorithms. This entails significant economy in computations. This technique makes no use of a data bank and its complexity is $O(N)$ where N is the number of pixels.