International Workshop on Computer Vision, April 26-30, 2004, IPM, Tehran

Performance Analysis of Three Likelihood Measures for Color Image Processing

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Image segmentation is a low-level operation, concerned with partitioning an image into homogeneous regions. In a large number of application, segmentation plays a fundamental role for the subsequent higher-level operations; such as recognition, object-based image/video compression, object tracking, scene analysis, and object-based image editing. Until recently, attention was focused on segmentation of grayscale images, but the advances in computational power and instrumentation has evolved the research on color image segmentation. Although, many researchers have tried to extend the methods of grayscale image segmentation to the color images, working in this multidimensional field, enables the implementation of more efficient methods. At the heart of any color image segmentation method, relies an appropriate likelihood measure or a suitable homogeneity criteria. In this paper, the performance of the three paradigms of *Euclidean distance, Mahalonobis distance,* and *reconstruction error* are analyzed in terms of achieving perfect likelihood measures, robustness, and leading to promising homogeneity decisions. While the Euclidean distance is proved to perform poor in all cases, the proposed reconstruction error out-performs the Mahalonobis distance with much lower computation cost.