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Department of Computer Science & Engineering

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ABSTRACT

Title: Image Segmentation

Image segmentation is an important component in many image analysis and computer vision tasks. Particularly, the problem of efficient interactive foreground object segmentation in still images is of great practical importance in image editing and has been the interest of research for a long time.

Classical image segmentation tools use either texture, color or edge (contrast) information for the purpose of segmentation. Deformable models, Graph-cut, GrabCut etc. are some prominent methods used for the segmentation of a foreground object. Object segmentation methods have helped in many computer vision areas, such as scene representation interpretation, content based image retrieval, object tracking in videos, medical applications etc. Most object segmentation techniques in computer vision are based on the principle of boundary detection

These segmentation techniques assume a significant and constant gray level change between the object(s) of interest and the background. However, this is not true in the case of textured images. In textured images, there exist many local edges of the texture micro units (texels), due to the basic nature of a texture image. In case of textured images, the object boundary is defined as the place where texture property changes. So to perform the correct segmentation in case of textured images, there is a need to incorporate the textural information in the segmentation process.

The objective of this work is to develop efficient methods for foreground object(s) segmentation in a given image. In the first part of the work, we develop techniques for the segmentation of single or multiple object(s) from an image in presence of foreground and background textures.

Our proposed technique is semi-automatic and only requires the user to define a rectangle (or polygon) around the object to be segmented, and does not require postcorrective editing. The proposed method is based on a probabilistic framework to integrate the outputs of Snake and GrabCut. We have demonstrated the efficiency and correctness of our proposed methods using a set of sufficiently difficult simulated and real world images.

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