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Segmentation of the Liver and Spleen From Abdominal CT Images Using Watershed Approach

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Abstract : The phase of segmentation is an important step in the processing and interpretation of medical images. In this paper, we focus on the segmentation of liver and spleen from the abdomen computed tomography (CT) images. The importance of our study comes from the fact that the segmentation of ROI from CT images is usually a difficult task. This difficulty is the gray's level of which is similar to the other organ also the ROI are connected to the ribs, heart, kidneys, etc. Our proposed method is based on the anatomical information and mathematical morphology tools used in the image processing field. At first, we try to remove the surrounding and connected organs and tissues by applying morphological filters. This first step makes the extraction of interest regions easier. The second step consists of improving the quality of the image gradient. In this step, we propose a method for improving the image gradient to reduce these deficiencies by applying the spatial filters followed by the morphological filters. Thereafter we proceed to the segmentation of the liver, spleen. To validate the segmentation technique proposed, we have tested it on several images. Our segmentation approach is evaluated by comparing our results with the manual segmentation performed by an expert. The experimental results are described in the last part of this work.The system has been evaluated by computing the sensitivity and specificity between the semi-automatically segmented (liver and spleen) contour and the manually contour traced by radiological experts.

Keywords : CT images, liver and spleen segmentation, anisotropic diffusion filter, morphological filters, watershed algorithm
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