Abstract

Vessel enhancement and segmentation is one of the crucial pre-processing steps in accurate vessel tree reconstruction in many chest CT scan imaging applications. Conservative vessel enhancement approaches used eigenvalues of Hessian-based filters, which are found to be sensitive to noise, fails to detect small ones, and sometimes give discontinued vessels due to junction suppression. Since Hessian-based filters cannot distinguish step edges from vessels effectively, in this paper, we propose a novel framework to overcome the problems for vessel enhancement for thorax CT images. The road map of proposed work has three steps. First, extract the lung region from thorax CT images based on Gray-level thresholding and morphological operations; then, according to the idea of the matched filter in different directions, and local entropy thresholding, to obtain more precise analysis in noisy environment and thus can correctly reveal entire vessels. Also, qualitative as well as quantitative evaluations performed on CT images show that the proposed filter generates better performance in comparison against two Hessian-based approaches (Frangi and Shikata).
References


**Index Terms**

Computer Science  
Signal Processing

**Keywords**

Vessel enhancement  
Hessian-based  
matched filter  
computer aided detection