Abstract

Arterial and venous trees separation in non-contrast pulmonary CT imaging facilitates extraction of quantitative measures at different tree levels. Reconstruction and separation of arterial and venous vascular trees is an essential step for diagnostic application systems used for maladies such as pulmonary embolism and coronary artery disease\cite{1}. Although, higher tree generations of vasculature, arteries and veins are indistinguishable by their intensity values, automatic artery-vein (AV) reconstruction and separation still remains a challenging problem in computational imaging and geometry processing due to patient specific structural abnormalities of vascular trees. This paper presents a novel technique of multi-scale fuzzy enhanced topo-morphologic opening algorithm (MSFTMO) to separate artery and vein from non-contrast CT images, which can be used for diagnosing arteriosclerosis as well. The algorithm combines fuzzy distance transform, a morphologic feature, with a topologic connectivity and a new morphological reconstruction step to iteratively open multi-scale fusions starting at large scales, progressing towards smaller scales\cite{1}\cite{2}. The algorithm is applied on fuzzy segmentation results via a small amount of intuitive interactions using an efficient graphical user interface.
An Optimized Technique of Tree Generation for Artery/Vein Separation in Non-Contrast CT Imaging


Index Terms

Computer Science
Fuzzy Systems

Keywords

Fuzzy segmentation  Fuzzy connectivity  Local Update and user interface  multi-scale fuzzy enhanced topo-morphologic opening algorithm  arteriosclerosis