

# International Journal of Biomedical Imaging

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## Virtual Contrast for Coronary Vessels Based on Level Set Generated Subvoxel Accurate Centerlines

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### Abstract

We present a tool for tracking coronary vessels in MRI scans of the human heart to aid in the screening of heart diseases. The vessels are identified through a single click inside each vessel present in a standard orthogonal view. The vessel identification results from a series of computational steps including eigenvalue analysis of the Hessian of the MRI image followed by a level set-based extraction of the vessel centerline. All identified vessels are highlighted using a virtual contrast agent and displayed simultaneously in a spherical curved reformation view. In cases of over segmentation, the vessel traces can be shortened by a click on each vessel end point. Intermediate analysis results of the vessel computation steps can be displayed as well. We successfully validated the tool on 40 MRI scans demonstrating accuracy and significant time savings over manual vessel tracing.

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