SEGMENTATION OF CORONARY ARTERIES FROM X-RAY ANGIOGRAPHY SEQUENCES DURING CONTRAST FLUID PROPAGATION BY IMAGE REGISTRATION

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Abstract Gaining information about heart and coronary arteries such as estimating the flow velocity and coronary flow reserve (CFR) by only using 2D + time X-ray angiography sequence is of great interest due to its availability. In the literature most methods are focused on segmenting the vessel lumen on 2D images. This paper propose to segment the coronary arteries from 2D+time X-ray angiography sequences during contrast fluid propagation, by using a multi-step method based on unsharp masking followed by an iterative process of segmenting and non-rigid registration, until the alignment from the registration process is satisfactory. The proposed method is evaluated using 11 sets of angiography sequences, and the results showed 97% accuracy, 99% specificity, and 93% sensitivity in segmentation of the coronary arteries compared to more than 4000 manually marked points.