

# Vascular Segmentation in X-ray Angiograms Using Frangi Filter

Yiğit Ali ÜNCÜ<sup>\*1,a</sup>, Hasan ÖZDOĞAN<sup>2,b</sup>

<sup>1</sup> Akdeniz University, Department of Biomedical Equipment Technology, 07070, Antalya

<sup>2</sup> Antalya Bilim University, Department of Medical Imaging Techniques, 07190, Antalya

## Abstract

X-ray angiography systems are essential method of diagnosis of coronary arteries from angiography images. Coronary angiography is known as the gold standard; for the evaluation of coronary artery disease. Nevertheless, Visual interpretation of angiography images are difficult due to the gradual crossing and overlap of the vessels on the angiogram. For this reason, many segmentation methods have been used to obtain blood vessel structures in the human body. These blood vessel segmentation methods can be classified; model-based tracking, propagation, artificial neural network (ANN), and fuzzy. Also, accurate segmentation of vascular structures in 2D angiography images is an important task for clinical practices such as computer-aided diagnosis, surgical planning and treatment. In general, Hessian-based vessel enhancement filters are known to be achieve in segmenting vessels from angiography images. In this study, the vascular structures of the coronary arteries were obtained by image processing including contrast enhancement methods using Frangi filter. We present the most important skill in coronary vessel segmentation methods by researching coronary vessel extraction and development method.

**Keywords:** Coronary arteries, Frangi filter, Image processing, Vascular segmentation