

3D CENTER LINE EXTRACTION ALGORITHM FOR CURVILINEAR STRUCTURES

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The blood vessel skeleton can be used as a solution for variety of problems. Those are: blood vessel description, abnormalities detection, branching point identification or data reduction. Skeletonization is an iterative process frequently used to reduce the pictorial content of an object.

The proposed algorithm is expansion of C. Steger work on center line extraction to 3 dimensions [1]. The main idea of algorithm is to approximate the blood vessel region locally by two dimensional second order polynomial [2]. This polynomial is placed in a plane orthogonal to the direction of blood vessel. This direction is determined by constructing Hessian matrix for each image point, and choosing the smallest eigenvalue of it. Points, where the polynomial reaches maximal value are determined. This way we obtain the sub-pixel precise skeleton of blood vessel.

The presented algorithm was applied on MRI angiography images with head blood vessels and with prepared test images, results will be presented.

REFERENCES

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- [2] Carsten Steger. Article in journal. In: *IEEE Transactions on Pattern Analysis and Machine Intelligence*, An Unbiased Detector of Curvilinear Structures, 1998, Vol. 20, nr. 2, 113–125.(in English)