Automatic Detection of Retinal Venous Beading and Tortuosity by using Image Processing Techniques

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Abstract
For the automatic detection of retinal venous beading and to calculate tortuosity of extracted retinal blood vessels. Venous beading represents focal areas of venous dilation and thinning of the venous walls. Venous beading is most easily comprehended as changes in the vascular caliber of the veins of the vascular arcades. This algorithm proceeds through three main steps 1. Preprocessing operations on high resolution fundus images 2. Simple vessel segmentation techniques formulated in the language of 2D Median Filter for retinal vessel extraction 3. Detection of Venous beading and Tortuosity from extracted blood vessels. Performance of this algorithm is tested using the fundus image database(300Fundus Images) taken from Dr. ManojSaswade, Dr. Neha Deshpande and online available databases diaretdb0, diaretdb1 and DRIVE. This algorithm achieves accuracy of 98% with 0. 92 sensitivity and 0 specificity for Saswadedatabase, for diaretdb0 accuracy 95% with 0. 95 sensitivity and 0 specificity, for diaretdb1 accuracy 96% with 0. 96 sensitivity and 0 specificity, and for DRIVE database 98% accuracy with 0. 98 sensitivity and 0 specificity.

References

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