Abstract

The changes in retinal blood vessels structure and progression of diseases such as diabetes, hypertension and retinopathy of prematurity (ROP) has been the subject of several large scale clinical studies. Proposed algorithm for the detection and measurement of blood vessels of the retina and finding the bifurcation points of blood vessels is general enough that it can be applied to high resolution fundus photographs. The algorithm proceeds through three main steps 1. Preprocessing operations on high resolution fundus images 2. For retinal vessel extraction, simple vessel segmentation techniques formulated in the language of 2D Median Filter 3. Minutiae techniques for finding bifurcation points of the extracted blood vessels. Performance
of this algorithm is tested using the fundus image database (240 images) taken from Dr. Manoj Saswade, Dr. Neha Deshpande and online available databases diaretdb0, diaretdb1 and DRIVE. This algorithm achieves accuracy of 96% with 0.92 sensitivity and 0 specificity for Saswade database, 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

- S. Jiméneza, P. Alemanya, I. Fondónb, A. Foncubiertab, A. Achab and C. Serranob &quot;Automatic detection of vessels in color fundus images&quot;; © 2009 Sociedad Española de Oftalmología. Published by Elsevier España, s. larchscespoftalmol. 2010;85(3):103-109
- Yogesh M. Rajput, Ramesh R. Manza, Manjiri B. Patwari, Neha Deshpande, &quot;Retinal Blood Vessels Extraction Using 2D Median Filter&quot;; Third National Conference on Advances in Computing(NCAC-2013), 5th to 6th March 2013, School of
Extraction of the Retinal Blood Vessels and Detection of the Bifurcation Points


A. Hoover and M. Goldbaum. Locating the optic nerve in a retinal image using the fuzzy convergence of the blood vessels. IEEE Trans. on Medical Imaging


Index Terms

Computer Science

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Keywords

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