

A SUPERVISED TECHNIQUE FOR IMPROVED SEGMENTATION OF FUNDUS VESSELS USING NEURAL NETWORK CLASSIFICATION

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ABSTRACT

The fundus vessel structure malformations such as variation in length, width, branching angles etc are one of the manifestations of the eye disease, Diabetic Retinopathy (DR) which is prevalent in diabetics' patients. For assessment of eye blood vessels and for early detection of DR an automated blood vessel segmentation method is necessary. This research work presents a supervised vessel segmentation method using gray level based features and neural network classifier. The fundus images present variations in pixel intensity, noise, etc. A preprocessing method employs steps to reduce these imperfections and generate images more suitable for extracting the pixel features.

The feature extraction from the preprocessed image is using the two gray level features based on differences in pixel intensities. A neural network classifier is used for pixel classification as vessel or nonvessel and generates a vessel segmented image. A post processing scheme is used to improve the segmentation result. The proposed method is implemented using MATLAB and evaluated over publically available DRIVE database in terms of sensitivity, specificity, positive predictive value, negative predictive value and accuracy. The comparison with a method using seven features based on average accuracy shows performance improvement.

KEYWORDS: Diabetic Retinopathy, Feature Extraction, Image Preprocessing, Neural Networks, Segmentation