PAPER

A combined fuzzy backtracking search optimization algorithm to localize retinal blood vessels for diabetic retinopathy

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Abstract

For diabetic retinopathy (DR) surgery, localization of retinal blood vessels is of paramount importance. Fundus images which are often used for DR diagnosis suffer from poor contrast (between the retinal background and the blood vessels, due to its size) limits the diagnosis. In addition to this, various pathological changes in retinal blood vessels may also be observed for different diseases such as glaucoma and diabetes. To alleviate, in this paper, an automated unsupervised retinal blood vessel segmentation technique, based on backtracking search optimization algorithm (BSA), is proposed. The BSA method is used to optimize the local search of fuzzy c-means clustering (FCM) algorithm to find micro-diameter sized vessels along with coarse vessels. The proposed technique is tested on two publicly available retinal datasets (i.e., STARE and DRIVE) and verified using the dataset collected from various hospitals in Bangalore and Mangalore, India. The results show that the performance of the proposed method is comparable to the conventional techniques in terms of sensitivity, specificity, and accuracy.

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