Evaluation of a System for Automatic Detection of Diabetic Retinopathy from Color Fundus Photographs for Screening Population

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Authors:
Raju S. Maher, Sangramsing N. Kayte, Mukta Dhopeshwarkar

Abstract

Diabetic Retinopathy is an eye disease and a common complication of diabetes that can cause vision loss if left undiagnosed at the initial stage. It is the prime cause of blindness in the working age population of the world. Colour fundus images of eyes are used by ophthalmologists to study eye diseases like diabetic retinopathy. Detection method is proposed to detect dark or red lesions such as microaneurysms and hemorrhages in fundus images. This method comprises of three stages. First, the green channel of the colour retinal image is preprocessed using polynomial contrast enhancement. Second, the candidate dark lesion objects are extracted from the contrast enhanced fundus image. A novel method is developed to extract candidate dark lesions based on matched filtering and local relative entropy thresholding. The performance of this technique is compared to mathematical morphology based dark lesion detection method. A hybrid method that combines both detection schemes is also tested for better segmentation. The final stage classifies true dark lesions from dark non-lesions using knn and svm classifiers. For image based evaluation, this method has
resulted with sensitivity, specificity and accuracy of 94.86% and 95.6% 95.38% respectively.

References


Index Terms

Computer Science

Image Processing
Keywords

Biomedical image processing, retinal Fundus images, microaneurysm detection, morphological operator.