

Automatic Method for Exudates and Hemorrhages Detection from Fundus Retinal Images

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Abstract : Diabetic Retinopathy (DR) is an eye disease that leads to blindness. The earliest signs of DR are the appearance of red and yellow lesions on the retina called hemorrhages and exudates. Early diagnosis of DR prevents from blindness; hence, many automated algorithms have been proposed to extract hemorrhages and exudates. In this paper, an automated algorithm is presented to extract hemorrhages and exudates separately from retinal fundus images using different image processing techniques including Circular Hough Transform (CHT), Contrast Limited Adaptive Histogram Equalization (CLAHE), Gabor filter and thresholding. Since Optic Disc is the same color as the exudates, it is first localized and detected. The presented method has been tested on fundus images from Structured Analysis of the Retina (STARE) and Digital Retinal Images for Vessel Extraction (DRIVE) databases by using MATLAB codes. The results show that this method is perfectly capable of detecting hard exudates and the highly probable soft exudates. It is also capable of detecting the hemorrhages and distinguishing them from blood vessels.

Keywords : diabetic retinopathy, fundus, CHT, exudates, hemorrhages

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