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Digital Retinal Images: Background and Damaged Areas Segmentation

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Abstract : Digital retinal images are more appropriate for automatic screening of diabetic retinopathy systems. Unfortunately, a significant percentage of these images are poor quality that hinders further analysis due to many factors (such as patient movement, inadequate or non-uniform illumination, acquisition angle and retinal pigmentation). The retinal images of poor quality need to be enhanced before the extraction of features and abnormalities. So, the segmentation of retinal image is essential for this purpose, the segmentation is employed to smooth and strengthen image by separating the background and damaged areas from the overall image thus resulting in retinal image enhancement and less processing time. In this paper, methods for segmenting colored retinal image are proposed to improve the quality of retinal image diagnosis. The methods generate two segmentation masks; i.e., background segmentation mask for extracting the background area and poor quality mask for removing the noisy areas from the retinal image. The standard retinal image databases DIARETDB0, DIARETDB1, STARE, DRIVE and some images obtained from ophthalmologists have been used to test the validation of the proposed segmentation technique. Experimental results indicate the introduced methods are effective and can lead to high segmentation accuracy.

Keywords : retinal images, fundus images, diabetic retinopathy, background segmentation, damaged areas segmentation
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