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# A Hybrid System for Enhancement Retinal Image Reduction

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A retina can use for the identification of a diabetic disease or diabetic retinopathy. Therefore, retinal images can be used for the early detection of diabetic retinopathy. The retinal images were produced by a fundus camera. Sometimes, it yielded an image that has low quality. This image contains noise and low contrast. The low-quality image causes the blood vessels in the retina unable to segment properly for disease detection. To enhance the low-quality image is needed a strong system to enhance the image quality. This study introduces a hybrid system that combined contrast enhancement and noise reduction to enhance image quality. The steps of contrast enhancement were gamma correction, CLAHE, and Local Contrast to create a better image quality. The steps of noise reduction were the result of contrast enhancement that should be combined with the Median Filter and Gaussian Filter. The method of Median and Gaussian filter can be used to determine the best method that could reduce the image noise. The results showed that the MSE, PSNR, and SSIM of the Gaussian filter were higher than the Median filter result.

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