Automatic Severity Level Classification of Diabetic Retinopathy

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Abstract

Diabetic Retinopathy (DR) is a major cause of blindness, when a disease strikes the retina due to diabetes. Early detection of retinopathy can rescue patients from vision loss. Therefore, in this paper we propose an automatic severity level assessment of the diabetic retinopathy using innovative image processing techniques combined with a multi-layered artificial neural network model for classification of retina images. The color retina images are collected from the standard DIARECTDB1 and MESSIDOR datasets. The collected data includes the images of normal eyes, as well as the images of mild, moderate and severe cases of Non-Proliferative Diabetic Retinopathy (NPDR). First, the lesions on the retina especially blood vessels, hemorrhages, exudates and microaneurysms are extracted from the image data. Then, the features, including the area of the segmented blood vessel and hemorrhages, the area of the segmented exudates, the number of microaneurysms in the segmented image, mean and standard deviation of segmented lesions, are extracted to measure the severity level of the disease. Based on our results, the proposed system obtains the accuracy of more than 93% which is higher than the accuracy of popular DR classification methods.
References

2. https://www.womenfitness.net/diabetic-retinopathy/

Index Terms
Keywords

Computer-aided diagnosis; Diabetic retinopathy; Blood vessels; Exudates; Hemorrhages; Microaneurysms.