Automated Early Detection of Diabetic Retinopathy Using Image Analysis Techniques

Abstract

Diabetic retinopathy (DR) is a common retinal complication associated with diabetes. It is a major cause of blindness in middle as well as older age groups. Therefore early detection through regular screening and timely intervention will be highly beneficial in effectively controlling the progress of the disease. Since the ratio of people afflicted with the disease to the number of eye specialist who can screen these patients is very high, there is a need of automated diagnostic system for diabetic retinopathy changes in the eye so that only diseased persons can be referred to the specialist for further intervention and treatment.
Various aspects and stages of retinopathy are analyzed by examining the colored retinal images. Microaneurysms are small saccular pouches caused by local distension of capillary walls and appear as small red dots. Their walls are thin and rupture easily to cause hemorrhages. Hard exudates are yellow lipid deposits which appear as bright yellow lesions. The bright circular region from where the blood vessels emanate is called the optic disk. The fovea defines the center of the retina, and is the region of highest visual acuity. The spatial distribution of exudates and microaneurysms and hemorrhages, especially in relation to the fovea can be used to determine the severity of diabetic retinopathy.

Image analysis tools can be used for automated detection of these various features and stages of Diabetes Retinopathy and can be referred to the specialist accordingly for intervention, thus making it a very effective tool for effective screening of Diabetic Retinopathy patients. DR patients require frequent, at least six monthly screening of vast number of patients and automating the process will go a long way in relieving the burden on the specialist and reducing the most common cause of preventable blindness.

Reference

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- Automated Feature Extraction for Early Detection of Diabetic Retinopathy in Fundus Images.

Index Terms

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Key words

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