

Prediction of Diabetic Retinopathy using Deep Learning

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Abstract: Diabetic retinopathy (DR) is a serious eye disease originating from diabetes mellitus and the most common cause of blindness in the developed countries. Early treatment can prevent patients from getting affected due to this condition or at least the progression of DR can be slowed down. The key to the early detection is to recognize micro-aneurysms (MAs) in the fundus of the eye in time. Thus, mass screening of diabetic patients is highly desired, but manual grading is slow and resource demanding. Micro-aneurysms (MAs) are early signs of DR, so the detection of these lesions is essential in an efficient screening program to meet clinical protocols. Early micro aneurysm detection can help reduce the incidence of blindness and micro-aneurysm detection is the first step in automated screening of diabetic retinopathy. A reliable screening system for the detection of MAs on digital fundus images can provide great assistance to ophthalmologists in difficult diagnoses. This project presents image processing techniques such as dark object detection to analyze the condition or enhance the input image in order to make it suitable for further processing and improve the visibility of micro-aneurysm in color fundus images. The correlation coefficient between each processed profile and a typical micro-aneurysm profile is measured and used as a scale factor to adjust the shape of the candidate profile. Each candidate is then classified based on Customized Sequential Convolutional neural network algorithm. We implement this retinal imaging in real time environments.

Keywords: Diabetic retinopathy.

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