Retinal Image Segmentation by using Texture-based Gabor Filter Optimized by Gradient Descent Followed by Evolutionary Algorithm

Abstract

Segmentation and localization of fundus image is a crucial step of pathologies in diagnosing the retinal diseases. Swelling in different parts of vasculature, as change in width along blood vessels and tortuosity may lead to eye-blindness. This process can be utilized in automated screening of the patients suffering from diabetic retinopathy. An attempt was made to apply texture based Gabor filter which captures the band-pass filter bank characteristics of the eye and its output was used to detect the discontinuities and derive statistical properties helping in segmenting and classifying retinal images. This work deals with a general problem of segmentation of multi-texture images using clustering of Gabor filter output features, required to be separated in order to get better classification efficiency. Therefore, an effort was done to formalize it as an objective function for tuning filter parameters with Gradient descent and Genetic Algorithm. The results showed both quantitative and qualitative segmentation results of retinal images with improved classification accuracy.

References


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**Index Terms**

Computer Science

Algorithms

**Keywords**

Retinal fundus images, blood vessels segmentation, Genetic Algorithm, Diabetic Retinopathy, Gabor Filter, Gaussian Post Filter.