OPTIC DISK SEGMENTATION ON PATIENT WITH DIABETIC RETINOPATHY USING GVF SNAKE

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ABSTRACT

Diabetic retinopathy (DR) is a complication of diabetes in the form of damage in the retina. Diabetic retinopathy is the world’s leading cause of blindness on patient with diabetes. An optic disk is the point in the eye where the optic nerve enters the retina and is formed by the meeting of all retinal ganglion cell axon. OD is a feature in fundus image that is easy to observe, hence its location becomes the reference to obtain other features in fundus image. The intensity of the OD is similar to exudate, that is the abnormality caused by DR appearing in fundus image. The segmentation of the OD is critical to the success of automatic diagnosis of DR. OD must be separated from disease features in order to prevent mal diagnose.

In this thesis a method of OD segmentation in the fundus image using GVF snake is proposed. First, pre-processing step is used to enhance image quality and eliminate the blood vessels. Initial contour is obtained by making some points using mouse. OD boundaries is then obtained using GVF snake. The results are validated by comparing with expert hand-drawn ground-truth.

This method is successful and the accuracy, sensitivity, and specificity are 99.81%, 97.12% and 99.86% respectively. This method is better than segmentation using traditional snake and segmentation using J. David’s method.

Key words: Fundus image, diabetic retinopathy (DR), GVF snake, optic disk (OD), segmentation.