Detection of Glaucoma based on Superpixel Generation and Feature Extraction

Abstract

Glaucoma is a chronic eye disease in which the optic nerve is progressively damaged. It is the second leading cause of blindness and is predicted to affect around 80 million people by 2020. Development of the disease leads to loss of vision which occurs gradually over a long period of time. Since it is very difficult to cure the disease at severe stage, it can be detected initially by using proposed method. This method proposes segmentation of optic disc and optic cup using superpixel classification and extraction of the feature values for glaucoma screening. Superpixels are local, coherent and provide a convenient primitive to compute local image features. In optic disc segmentation, superpixels using SLIC (simple linear iterative clustering) is generated which is followed by feature extraction where Contrast Enhanced histogram and center surround statistics (in which Gaussian pyramid based feature is used) are implemented, then each superpixel is classified as disc or non-disc to deform the exact disc region. Using the same process, the optic cup is also segmented. The optic disc and optic cup boundaries in retinal fundus image are identified using Randomized Hough's transform. The 1280 feature values are obtained from Contrast Enhanced histogram and 36 feature values are obtained from center surround statistics. Therefore a total of 1316 feature values of the reference fundus image are stored in the database. Then the feature values of the input or test image are obtained and compared with the set of sample values stored in database using
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Support Vector Machine classifier. The set of values which is nearest to the set of feature values obtained from the input image is then mapped to group set. Hence, presence of Glaucoma is detected.

References

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- Jiu Cheng, Jiang Liu Superpixel classification based optic disk and optic cup segmentation for glaucoma screening IEEE transactions on medical imaging, vol 2, no. 6, June 2013


**Index Terms**

Computer Science Image Processing

**Keywords**

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