Glaucoma Screening using Digital Fundus Image through Optic Disc and Cup Segmentation

Abstract

Globally, glaucoma is the major cause of visual impairment. It is a chronic eye disease in which optic nerve damages progressively due to the raised Intraocular Pressure (IOP) of the eye. The technique proposed in this paper allows automatic detection of the glaucoma using digital fundus image by extracting the features like vertical cup to disc ratio (CDR), its area ratio, horizontal to vertical CDR and the ratio of area of blood vessels in inferior-superior region to that in the nasal-temporal region of the Optic Disc (OD) (ISNT Ratio) by segmenting OD, cup and
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blood vessels. The method proposed for OD segmentation is based on geodesic active contour model. The cup segmentation method is based on the structural properties and color information of the cup region and blood vessels are segmented by morphological technique. The performance evaluation of the proposed technique has been carried out on 200 images comprising 100 normal and 100 glaucomatous images. Support Vector Machine (SVM) is used to classify the fundus images into normal and glaucoma class with sensitivity, specificity, accuracy, Positive Predictive Value (PPV) and Negative Predictive Value (NPV) of 95%, 97%, 96%, 96. 94% and 95. 10% respectively. The results obtained by proposed technique indicate that the features are clinically important in glaucoma detection.

References

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Index Terms

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