

ABSTRACT

The severity of glaucoma can be observed by categorising glaucoma diseases into several classes based on a classification process. The two most suitable parameters, cup-to-disc ratio (CDR) and peripapillary atrophy (PPA), which are commonly used to identify glaucoma are utilised in this study to strengthen the classification. First, an active contour snake is employed to retrieve the value of the optic disc (OD) and optic cup (OC), which is required to calculate the CDR. Moreover, Otsu segmentation and thresholding techniques are used to identify PPA, and the features then extracted using a grey-level co-occurrence matrix (GLCM). An advanced segmentation technique, combined with an improved classifier called dynamic ensemble selection (DES), is proposed to classify glaucoma. Because DES is generally used to handle an imbalanced dataset, the proposed model is expected to detect glaucoma severity and determine the subsequent treatment accurately. An evaluation using three data sets of 250 retinal fundus images (200 training and 50 test) indicates that the proposed model can achieve a higher accuracy (0.96) than the five state-of-the-art models.

Keywords: Classification, Active Contour Snake, Segmentation, Glaucoma Severity, Dynamic Ensemble Selection