Attention Based Fully Convolutional Neural Network for Simultaneous Detection and Segmentation of Optic Disc in Retinal Fundus Images

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Abstract : Accurate segmentation of the optic disc is very important for computer-aided diagnosis of several ocular diseases such as glaucoma, diabetic retinopathy, and hypertensive retinopathy. The paper presents an accurate and fast optic disc detection and segmentation method using an attention based fully convolutional network. The network is trained from scratch using the fundus images of extended MESSIDOR database and the trained model is used for segmentation of optic disc. The false positives are removed based on morphological operation and shape features. The result is evaluated using three-fold cross-validation on six public fundus image databases such as DIARETDB0, DIARETDB1, DRIVE, AV-INSPIRE, CHASE DB1 and MESSIDOR. The attention based fully convolutional network is robust and effective for detection and segmentation of optic disc in the images affected by diabetic retinopathy and it outperforms existing techniques.

Keywords : attention-based fully convolutional network, optic disc detection and segmentation, retinal fundus image, screening of ocular diseases

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