DEEP LEARNING BASED FOR FUNDUS ANALYSIS

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Motivation and Objectives

Glaucoma is an irreversible eye disease and it is considered the second leading cause of blindness globally. Its early diagnosis is very important to prevent glaucoma.

The REFUGE2 competition include three tasks:

Task 1: Classification of clinical Glaucoma

Task 2: Segmentation of Optic Disc and Cup

Task 3: Localization of Fovea

Classification Method

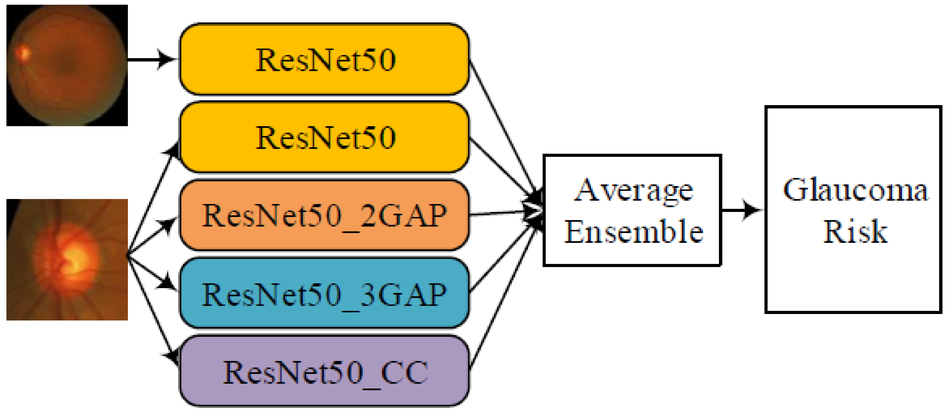


Figure 1. Ensemble learning models of glaucoma classification.

Segmentation Method

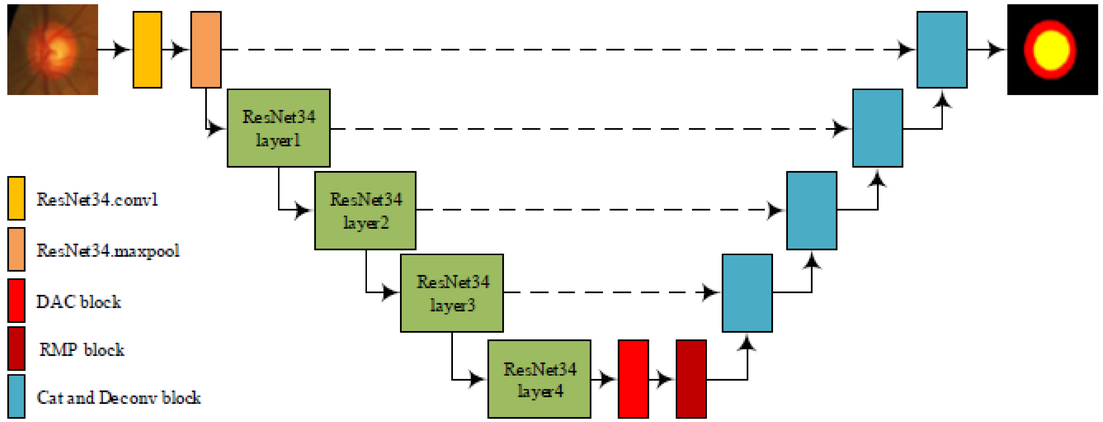


Figure 2. The architecture of the CENet. It is based on UNet model, and ResNet34 module replace the encode path.

Localization Method

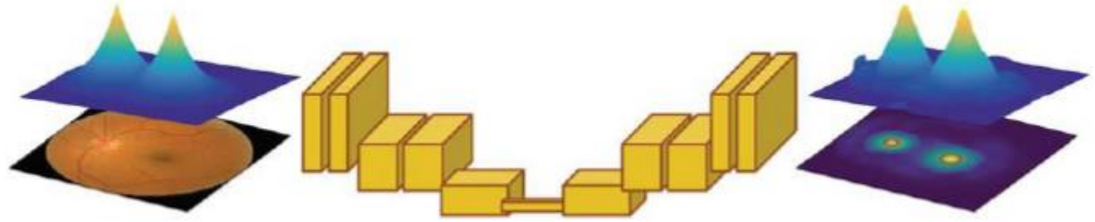
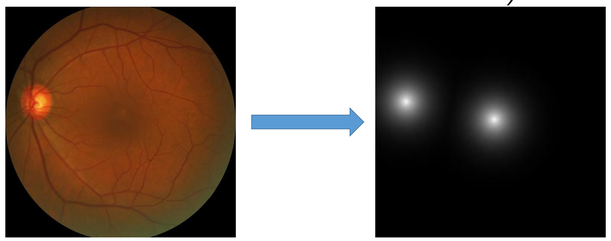


Figure 3. The method for joint fovea and OD localization via regressing a distance map.

Bi-Distance Map: $B(x,y) = \min\left(\sqrt{(x-x_{od})^2+(y-y_{od})^2}, \sqrt{\left(x-x_{fov}\right)^2+\left(y-y_{fov}\right)^2}\right)$

Normalized form: $\mathcal{B}^N(x,y) = \left(1 - \frac{\mathcal{B}(x,y)}{\max_{\Omega} \mathcal{B}(x,y)}\right)^{\gamma}$



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