

**Joint Segment-level and Pixel
wise Losses for Deep Learning
based Retinal Vessel
Segmentation**

MICANS INFOTECH

ABSTRACT

- Deep learning based methods for retinal vessel segmentation are usually trained based on pixel-wise losses, which treat all vessel pixels with equal importance in pixel-to-pixel matching between a predicted probability map and the corresponding manually annotated segmentation.
- However, due to the highly imbalanced pixel ratio between thick and thin vessels in fundus images, a pixel-wise loss would limit deep learning models to learn features for accurate segmentation of thin vessels, which is an important task for clinical diagnosis of eye-related diseases.

EXISTING SYSTEM

- Among various features in fundus images, retinal vessel features play a crucial role.
- Taking diabetic retinopathy as an example, microaneurysm, one fundamental symptom, generally exists along retinal vessels.
- For the extraction of retinal vessel features, generating an accurate segmentation of retinal blood vessels is essential.
- However, manual annotation by a human observer is time-consuming

PROPOSED SYSTEM

- In this paper, we propose a new segment-level loss which emphasizes more on the thickness consistency of thin vessels in the training process.
- By jointly adopting both the segment-level and the pixel-wise losses, the importance between thick and thin vessels in the loss calculation would be more balanced.
- As a result, more effective features can be learned for vessel segmentation without increasing the overall model complexity.

HARDWARE REQUIREMENTS

- Processor - Intel
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Monitor - SVGA

MICANS INFOTECH

SOFTWARE REQUIREMENTS

- Tool - MATLAB R2012
- Operating system - Windows Xp, 7

MICANS INFOTECH

REFERENCE

- [1] G. B. Kande et al., “Unsupervised fuzzy based vessel segmentation in pathological digital fundus images,”, 2010.
- [2] T. Chakraborti et al., “A self-adaptive matched filter for retinal blood vessel detection,”, 2014.
- [3] X. Yang et al., “Accurate vessel segmentation with progressive contrast enhancement and canny refinement,”, 2014.
- [4] W. Li et al., “Analysis of retinal vasculature using a multiresolution hermite model,”Feb. 2007.
- [5] B. S. Y. Lam and Y. Hong, “A novel vessel segmentation algorithm for pathological retina images based on the divergence of vector fields,”, Feb. 2008.