ON THE AUTOMATIC COMPUTATION OF THE ARTERIO-VENOUS RATIO IN RETINAL IMAGES

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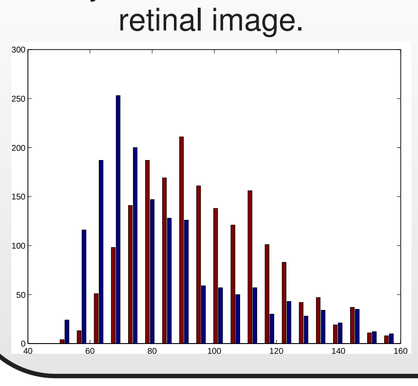
Abstract

Abnormalities in the retinal vessel tree are associated with different pathologies. Usually, they affect arteries and veins differently. Thus, the arterio-venous ratio (AVR), is a measure of retinal vessel caliber, widely used in medicine to study the influence of these irregularities in disease evolution. Hence, the development of an automatic tool for AVR computation as well as any other tool for diagnosis support need an objective, reliable and fast artery/vein classifier.

Artery/vein classification problems

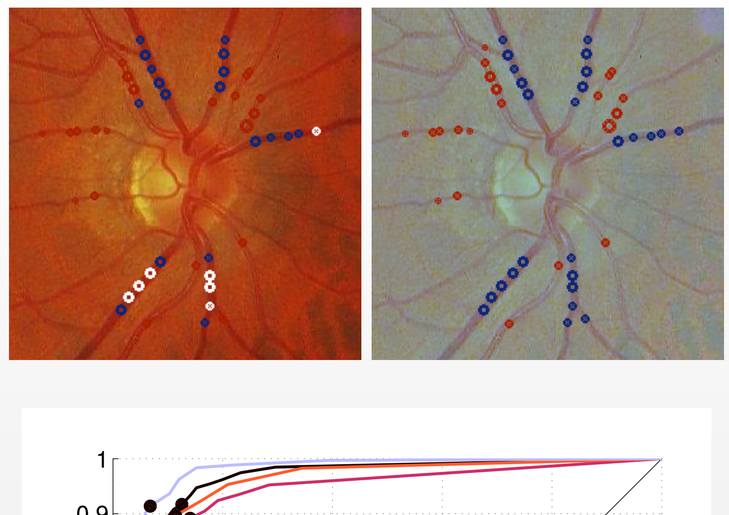
Pixel colors (green channel) in artery and vein vessels in a retinal image.

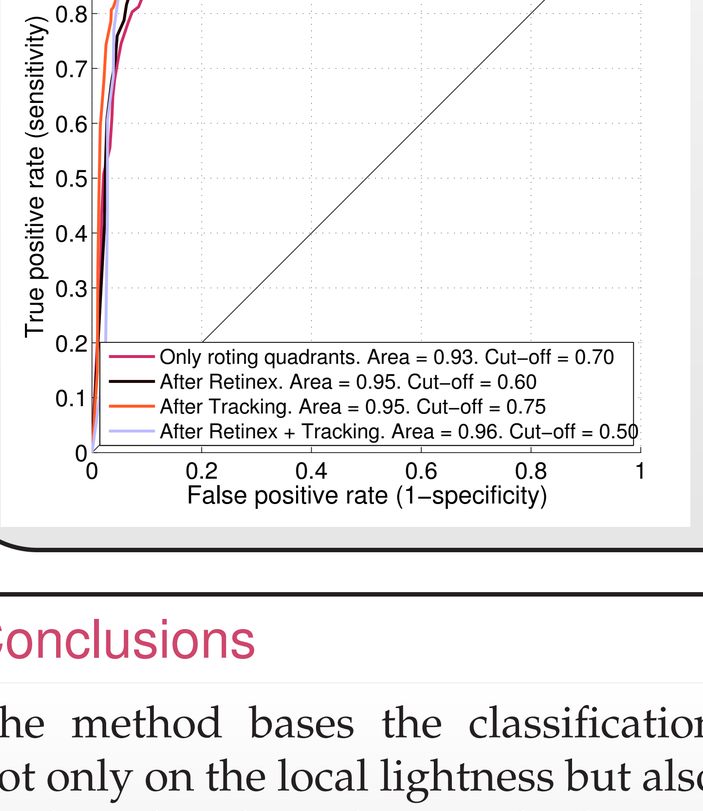


- Arteries are lighter than veins.
- Differences decrease with the vessel diameter.
- Intra-image uneven lightness due to biological characteristics such as pigmentation.
- Inter-image lightness and contrast variability.

Methodology

Results





Conclusions

The method bases the classification not only on the local lightness but also on the color along the vessel. The vessel clustering is still local but the tracking strategy and multi-scale retinex technique minimize the effect of the lightness variability of the image.

References

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[2] S. G. Vázquez, N. Barreira, M. G. Penedo, M. Penas, A. Pose-Reino, 'Automatic classification of retinal vessels into arteries and veins', in *7th International Conference Biomedical Engineering (BioMED 2010)*, 2010