

# Evaluation of diagnostic parameters of retinal vessels in fundus images in the area of the optic nerve head

A.V. Kupriyanov<sup>1,2</sup>, N.Y. Ilyasova<sup>1,2</sup>, M.A. Ananiin<sup>1,2</sup>

<sup>1</sup>Image Processing Systems Institute of the RAS,

<sup>2</sup>Samara State Aerospace University (SSAU)

## Abstract

The paper proposes a technology for evaluating diagnostic parameters of blood vessels in the area of the optic nerve disc based on the segmentation method. The geometric characteristics of the selected areas of blood vessels and the area of the optic nerve head are calculated. The dependence of the algorithm efficiency was studied under the influence of various types of noise and distortions on the synthesized and full-scale diagnostic images.

**Keywords:** diagnostic of blood vessels, segmentation method, area of the optic nerve head are, full-scale diagnostic images

**Citation:** Kupriyanov AV, Ilyasova NY, Ananiin MA. Evaluation of Diagnostic Parameters of Retinal Vessels in Fundus Images in the Area of the Optic Nerve Head. Computer Optics 2006; 29: 141-145.

**Acknowledgements:** This work was supported by the Russian-American program “Fundamental Research and Higher Education” (BRHE) and the program of the Presidium of the Russian Academy of Sciences “Fundamental Sciences for Medicine” and the RFBR grant No. 06-07-08006-ofi.

[Access full text \(in Russian\)](#)

## References

- [1] Jomier J, Wallace DK, Aylward SR. Quantification of retinopathy of prematurity via vessel segmentation. In Book: Ellis RE, Peters TM, eds. Medical image computing and computer-assisted intervention – MICCAI 2003. Berlin, Heidelberg, New York: Springer-Verlag; 2003: 620-626. DOI: 10.1007/978-3-540-39903-2\_76.
- [2] Osareh A, Mirmehdi M, Thomas B, Markham R. Classification and localisation of diabetic-related eye disease. In Book: Heyden A, Sparr G, Nielsen M, Johansen P, eds. Computer vision – ECCV 2002. Berlin, Heidelberg: Springer; 2002: 502-516. DOI: 10.1007/3-540-47979-1\_34.
- [3] Nikitaev VG, Pronichev AN, Pogorelov AK, Berdnikov EYu. Computer ophthalmological complex «ATLANT–RETINA». Automated image processing system «ATLANT–BIOPSIYA» [In Russian]. Source: [www.eyenews.ru](http://www.eyenews.ru).
- [4] Petrovskii AN, Vcherashnuk SP, Kade MA. Evaluation of microcirculatory disorders by the method of video microscopy [In Russian]. Angiology and Vascular Surgery 2004; 10(3): 71-72.
- [5] Kupriyanov AV, Ilyasova NYu, Ananjin MA, Malafeev AM, Ustinov AV. Evaluation of the geometric parameters of the optic nerve head in the fundus images [In Russian]. Computer Optics 2005; 28: 221-228.
- [6] Demidovich BP, Maron IA, Shuvalova EZ. Numerical methods in analysis: Approximation of functions, differential and integral equations [In Russian]. Moscow: "Mir" Publisher; 1970.
- [7] Soifer VA, ed. Methods for computer design of diffractive optical elements. New York: John Wiley & Sons Inc; 2002. ISBN: 978-0-471-09533-0.
- [8] Ilyasova NYu, Adamenko IN, Kupriyanov AV, Ustinov AV, Ananjin MA, Yatulchik VV. Development of methods for isolating anomalous structures in the fundus image [In Russian]. Computer Optics 2003; 25: 202-209.
- [9] Ilyasova NYu, Ustinov AV, Baranov VG. An expert computer system for diagnosing eye diseases from retina images. Optical Memory and Neural Networks 2000; 9(2): 133-145.