Annotation

# Wide-angle deconvolution of human's eye retinal images.

This diploma paper presents the results of blind deconvolution algorithms, applied to human eye retinal images, acquired by wide-angle bio-microscopy. The necessity of usage blind deconvolution algorithms lies in the fact, that Zernike coefficients, describing eye aberrations, are known only in the middle of retinal images. Moving from the center of images, angle between light rays and optical axis is also changed. As the result, Zernike coefficients differs from those, obtained in the middle of image. This causes incorrect image restoration by Weiner filter. The process, designated self-deconvolving data reconstruction algorithm (SeDDaRA) has been successfully applied to digitized retinal images of human eye. Using Gullstrand eye model, it is possible to calculate dependencies of aberrations amplitude on the angle between the optical axis and light rays reflected from retina. These aberrations are calculated for astigmatism, coma and spherical aberration. Self-deconvolving data reconstruction algorithm allows to find point-spread-function of the optical system. Using parametric function minimization algorithm, it is possible to retrieve Zernike coefficients from acquired PSF-function. This procedure repeats for various parts of retinal image and Zernike coefficient's dependencies are obtained. These dependencies are then analyzed and compared with those, calculated using Gullstrand eye mode.

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