

AUTOMATIC BRIGHTNESS AND CONTRAST ENHANCEMENT OF GRAYSCALE IMAGES BASED ON POWER TRANSFORMATIONS

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It's often necessary to increase images contrast and brightness during their processing. However, it's complicated by significant differences in the characteristics of the original images, the presence of dark and light areas within a single image, and the usage of methods that require adjusting control parameters for the processed image. The usage of automatic methods for increasing brightness and contrast, for example, those described in [1], can lead to an increase in computational costs, which is not always acceptable.

The purpose of this work is to describe a method of automatic brightness and contrast enhancement of grayscale images based on a simple power transformation that does not require high computational costs.

Original grayscale image I is scaled to the range $[0,1]$, after which the output image I^{out} is formed based on the application of the following power transformation: $I^{out} = I^{(I/(2+\bar{I}-I))}$, where \bar{I} is the average of the scaled input image I .

The experimental results were obtained on the example of processing a grayscale dark image, shown in Figure 1 a. The usage of the proposed transformation (Figure 1 b) allows us to achieve brightness enhancement and some contrast improvement without losing the grayscale correspondence with the original image.



Figure 1 – Results of processing a grayscale dark image: a – source image (256x256); b – brightness and contrast enhancement

References (translated):

1. Yegorov A., Akhmetshina L. Optimizatsiya yarkosti izobrazheniy na osnove neyro-fazzi tekhnologiy : monografiya, Lambert, 2015. 139 P.