Algorithms of image processing presented in pseudo-holographic codes: development and research

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Abstract:

This paper analyses two methods of pseudo-holographic coding: “regular” and “stochastic”. The results of a comparative analysis of these transformations are presented in relation to the problem of image recovery in case of loss of some information. A method is proposed which involves inserting an electronic watermark into a digital image for a regular method of pseudo-holographic coding. The results of the analysis of the watermark resistace to the "typical" transformations of digital images are presented. The applicability limits of the regular pseudo-holographic coding method for solving specific applied problems are determined.

Keywords: image processing, pseudo-holographic codes, stochastic, comparative analysis, image recovery, electronic watermark, digital image.

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References:

[1] Bruckstein AM, Holt RJ, Netravali AN. Holographic representation of images. IEEE Trans Image Process 1998; 7(11): 1583-1587. DOI: 10.1109/83.725365.
[2] Bruckstein AM, Holt RJ, Netravali AN. On holographic transform compression of images. Int J Imaging Syst Technol 2001; 11(5): 292-314. DOI: 10.1002/ima.1015.
[3] Pratt WK. Digital image processing. New York, NY: John Wiley and Sons Inc; 1978. ISBN: 978-0-471-01888-9.
[4] Pratt WK. Digital image processing. New York, NY: John Wiley and Sons Inc; 1978. ISBN: 978-0-471-01888-9.
[5] Kolesov VV, Zalogin NN, Vorontsov GM. Pseudo-holographic coding method [In Russian]. Proc 4th Int Conf DSPA-2002 2002: 1-3.
[6] Voronin VV. Holographic representation in problems of image processing [In Russian]. Proc 5th Int Conf "Pattern Recognition and Image Analysis: New Information Technologies (ROAI-5-2000)" 2000; 2: 237-241.
[7] Bruckstein AM, Holt RJ, Netravali AN. Self-similar Image Sampling Schemes: Holographic and Low Discrepancy Properties. Proc Fundamental Structural Properties in Image and Pattern Analysis Workshop 1999; B 130: 59-65.
[8] Soifer VA, ed. Methods for computer design of diffractive optical elements. New York: John Willey and Sons Inc; 2002. ISBN: 978-0-471-09533-0.