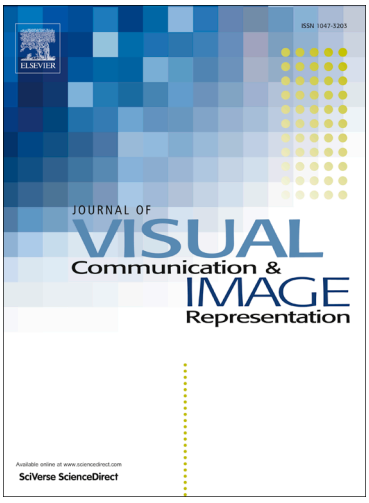

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Quaternion pseudo-Zernike moments combining both of RGB information and depth information for color image splicing detection

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ABSTRACT

The quaternion representation (QR) used in current quaternion-based color image processing creates redundancy when representing a color image of three components by a quaternion matrix having four components. In this paper, both RGB and depth (RGB-D) information are considered to improve QR for efficiently representing RGB-D images. The improved QR fully utilizes the four-dimensional quaternion domain. Using this improved QR, firstly we define the new quaternion pseudo-Zernike moments (NQPZMs) and then propose an efficient computational algorithm for NQPZMs through the conventional pseudo-Zernike moments (PZMs). Finally, we propose an algorithm for color image splicing detection based on the NQPZMs and the quaternion back-propagation neural network (QBPNN). Experimental results on four public datasets (DVMM, CASIA v1.0 and v2.0, Wild Web) demonstrate that the proposed splicing detection algorithm can achieve almost 100% accuracy with the appropriate feature dimensionality and outperforms 14 existing algorithms. Moreover, the comparison of six color spaces (RGB, HSI, HSV, YCbCr, YUV, and YIQ) shows that the proposed algorithm using YCbCr color space has the overall best performance in splicing detection.

Keywords: Quaternion; splicing detection; pseudo-Zernike moment; back-propagation neural network; depth information.

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