Review on Quaternion Gradient Operator with Marginal and Vector Approaches for Colour Edge Detection

Authors : Nadia Ben Youssef, Aicha Bouzid

Abstract : Gradient estimation is one of the most fundamental tasks in the field of image processing in general, and more particularly for color images since that the research in color image gradient remains limited. The widely used gradient method is Di Zenzo's gradient operator, which is based on the measure of squared local contrast of color images. The proposed gradient mechanism, presented in this paper, is based on the principle of the Di Zenzo's approach using quaternion representation. This edge detector is compared to a marginal approach based on multiscale product of wavelet transform and another vector approach based on quaternion convolution and vector gradient approach. The experimental results indicate that the proposed color gradient operator outperforms marginal approach, however, it is less efficient then the second vector approach.

Keywords : gradient, edge detection, color image, quaternion

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