A new alternative for morphological reconstruction of RGB color images

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Abstract

Geodesic erosion and dilation are essential operations used for the morphological reconstruction of grayscale images [1]. Both are iterative operations whose stopping criteria is the occurrence of idempotence. For color morphological operations, like morphological reconstruction, it is necessary to determine a color space and an ordering of colors, but choosing an adequate ordering for color spaces remains a hard problem [2]. Sometimes it is assumed that a specific component receives more importance in regard to the others (lexicographical ordering) [3]. This, however, requires the a priori specification of the relative importance of the components. In many situations, choosing the importance of the components is not easy, because it also requires a priori information about the image. It is increasingly common in image processing to use morphological reconstruction filtering, converting it into a very versatile tool for applications to computer vision, such as the segmentation or suppression of noise [4],[5]. In this work a new approach for morphological reconstruction for RGB color images is presented, which is commonly used by monitors. The extension of the basic erosion and dilation operators is performed considering local characteristics of the image and trying to avoid the arbitrary selection of the main component (primary problem in the classic ordering method). Our proposal shows good results for the morphological reconstruction filtering, for example to eliminate the brightness (that consists of the simple operation of opening by reconstruction, which corresponds to reconstructing an eroded image of the bright image to be processed) in comparison to the morphological reconstruction used in the vectorial lexicographical order.

Keywords RGB color image, lexicographical ordering, morphological reconstruction.

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