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Image Classification Using Multiscale Information Fusion Based on Saliency Driven Nonlinear Diffusion Filtering

Abstract:

In this paper, we propose saliency driven image multiscale nonlinear diffusion filtering. The resulting scale space in general preserves or even enhances semantically important structures such as edges, lines, or flow-like structures in the foreground, and inhibits and smoothes clutter in the background. Theimage is classified using multiscale information fusion based on the original image, the image at the final scale at which the diffusion process converges, and the image at a midscale. Our algorithm emphasizes the foreground features, which are important for image classification. The backgroundimage regions, whether considered as contexts of the foreground or noise to the foreground, can be globally handled by fusing information from different scales. Experimental tests of the effectiveness of the multiscale space for the image classification are conducted on the following publicly available datasets: 1) the PASCAL 2005 dataset; 2) the Oxford 102 flowers dataset; and 3) the Oxford 17 flowers dataset, with high classification rates.