ADAPTIVE BILATERAL EXTENSOR
FOR IMAGE INTERPOLATION

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ABSTRACT

A novel algorithm for image interpolation, referred to as adaptive bilateral extensor interpolation, is proposed in this thesis. It combines useful features of an extensor-based algorithm, utilizing a non-linear mapping between Euclidean distances and pixel intensities for interpolation. An adaptive robust structure tensor is employed to obtain the existence and orientation of edge boundaries. In addition, an edge-preserving bilateral filter consisting of spatial and intensity components is used to preventing interpolation across edge boundaries. Results show the adaptive bilateral extensor to be qualitatively and quantitatively superior to current state-of-the-art interpolation algorithms. The adaptive bilateral extensor is particularly advantageous since it is able to supersample an image without producing aliasing or artifacts in the interpolated result. The proposed algorithm is also applied to pan-sharpen remote sensing images.