

## 图形图像技术

### 非局部的变分正则化图像放大算法

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**摘要:** 针对Chambolle图像放大模型存在分块效应,提出一种非局部的变分正则化图像放大算法。该算法的思想是构造一个适用于图像放大的变分泛函,该泛函由正则项和数据保真项构成,其中图像的正则项是用非局部全变差范数进行估计,进而用迭代投影方法求泛函的最小解,即为放大后的图像。与传统的图像插值方法不同,该算法是用变分的思想进行图像放大,非局部全变差的引入更使得该算法不只是利用图像的单个像素点,或某一邻域内的灰度和梯度信息进行放大,而是更大范围地利用了图像本身的信息,这将更有效地保留图像特征,避免了Chambolle方法在图像放大时出现的分块效应。实验结果表明,该算法能更好地保留边缘和细节信息,放大图像的清晰度比Chambolle图像放大方法和样条插值的效果要好。

**关键词:** 图像放大 变分泛函 非局部全变差

### Variational image zooming based on nonlocal total variation

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**Abstract:** A regularized image zooming model based on nonlocal total variation was proposed, with regard to that the Chambolle image zooming model has blocky effects. It consisted of regular term and fidelity term. The zoomed image was obtained by minimizing the variational function which used the nonlocal total variation norm to measure the regularity of the image. Unlike the traditional image zooming by interpolation, the variational model was incorporated in the new zooming algorithm and the use of nonlocal operator made the algorithm not just use a single pixel of the image, or gray and gradient information in a neighborhood to amplify, but use the information of image content itself widely that will avoid blocky effects of Chambolle's model. The experimental results show that the new algorithm can preserve better the border and details. It achieves better effect than Chambolle's method and the interpolation by using spline.

**Keywords:** image zooming variational function nonlocal total variation

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