

图形、图像、模式识别

改进的结构相似医学图像质量评价方法

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摘要 医学图像质量评价从基本方法上和普通图像评价是相同的。基于人眼视觉系统的图像质量客观评价一直是图像处理领域的研究热点。Zhou Wang等人提出了著名的客观质量评价方法: 结构相似度 (SSIM), 它的理论基础是人眼视觉系统能高度自适应地提取场景中的结构信息。其评价性能优于PSNR (或MSE)。但是SSIM评价模糊失真类的图像准确性较低。在深入研究SSIM算法的基础上, 提出一种改进SSIM算法: 基于梯度方向信息的图像质量评价方法 (GDSSIM)。实验结果表明, GDSSIM评价高斯模糊 (GBlur) 图像库时准确性明显高于PSNR和SSIM, 评价Fast Fading图像库时准确性也有明显优势。最后, 初步探讨了以上图像质量评价算法在医学图像上的应用。

关键词 [医学图像质量评价](#) [结构相似度 \(SSIM\)](#) [梯度方向](#) [人眼视觉系统](#)

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Improved SSIM medical image quality assessment

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Abstract

Image objective quality assessment has been widely used in image processing to maintain and improve the quality of images being processed. Many researchers have studied the objective quality assessment method based on Human Visual System (HVS). Recently, the well-known image quality assessment structure similarity (SSIM) is proposed by Zhou Wang, under the assumption that the HVS is highly adapted for extracting structural information from a scene. The simulation results have proved that it is better than PSNR (or MSE). But, it fails in measuring blurred images. In this paper, improved method is developed which is called as image quality assessment based on gradient direction (GDSSIM). Experiment results show that GDSSIM gets the best performance for blurred images. Furthermore, GDSSIM has a better performance than SSIM for Fast Fading images. These algorithms are applied on medical image assessment.

Key words [medical image quality assessment](#) [structural similarity \(SSIM\)](#) [gradient direction](#) [Human Visual System \(HVS\)](#)

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