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信息科学

视觉感知的彩色图像质量积极评价方法

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**摘要：**针对现行的被动(消极)彩色图像质量评价方法存在的问题，深入研究了人类视觉感知彩色图像特征的质量参数：彩色图像平均对比度、彩色图像平均信息熵、彩色图像平均亮度(平均灰度)、彩色图像平均层次因子和彩色图像平均带宽因子。以上述研究为基础，构建了基于扰动变换的主动(积极)彩色图像综合质量评价函数(CAF)。研究发现CAF是扰动参数Delta和Theta的函数，通过对扰动参数进行变换，可以使CAF达到最大值，从而实现对单幅彩色图像的质量评价和质量改善。分别对窄带谱、宽带谱和全带谱3种不同色度谱类型的彩色图像进行了积极评价，结果表明，纳入平均带宽因子和平均层次因子两个参数的彩色图像质量积极评价方法符合人类视觉主观评价要求，可使扰动变换获得的彩色图像更加柔和、更富有层次感。该方法不仅能评价单幅彩色图像质量的好坏，还可以通过扰动变换改善彩色图像质量。

**关键词：**视觉感知 彩色图像质量 积极评价 扰动变换 平均带宽因子 平均层次因子

## Active assessment of color image quality based on visual perception

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**Abstract:** According to the shortages existing in passively color image quality assessment currently, this paper researched the five parameters of color image feature quality perceived by human visual: average contrast, average information entropy, mean brightness(gray level),average level factor, and average bandwidth factor. On the basis of research mentioned above, the quality assessment function of color image(CAF) actively based on disturbance transform was constructed. It found that CAF is the functions of disturbance parameter Delta and Theta. Through the transformation of disturbance parameters, the overall quality evaluation function of color image would achieve the maximum value of CAF, so that the single color image quality could be assessed and improved. Several kinds of color images with narrower band, wider band and whole band spectra were assessed, and it demonstrates that the active assessment method of color image quality by considering the average bandwidth factor and average hierarchy factor conforms to the requirement of human visual subjective evaluation, and can allow the color image obtained by disturbance transformation to be more soft and more hierarchical. This method can not only evaluate the quality of single color image, but also can improve the color image quality by disturbance transformation.

**Keywords:** vision perception color image quality active assessment disturbance transformation Average bandwidth factor (ABWF) Average hierarchy factor (AHF)

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