

面向自然图像的自适应主色提取方法研究

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摘要: 提出了一种面向自然图像的自适应主色提取算法.对于一幅用户给定的自然图像,算法首先为了避免 RGB 空间处理时易造成颜色失真的缺陷,将图像的颜色空间转换到 Lab 空间;然后对图像进行尺寸压缩、图像增强和去噪等预处理以消除图像中的干扰信息且较好地保留细节信息;最后通过将 Silhouette 轮廓系数与传统 K 均值聚类算法有机地结合在一起,自适应地提取出自然图像中的最优主色集.对大量拍摄于各种自然环境下的图像进行测试,实验结果表明算法可有效地将自然图像中的主色自动提取出来,且较准确地代表了原图像中的颜色特征.

关键词: 自然图像; 主色提取; 自适应; K 均值聚类; Silhouette 轮廓系数

Research on Adaptive Main Colors Extraction Algorithm for Natural Images

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Abstract: A framework of adaptive main color extraction algorithm for natural image is proposed in order to make the artistic effects of oil painting on computer much more similar to the hand-printed style in color. As for a natural image provided by a user, the algorithm first transforms the color space of the image into the Lab space to avoid the color distortion caused by the RGB spaceprocessing. Then, the natural image is preprocessed through size compression, image enhancement and denoising in order to eliminate the interference information and preserve the detail information to a better extent in the image. Finally, the silhouette contour factor is effectively combined with the traditional K-means clustering algorithm to extract optimal main colors set in the natural image. A quantity of experiments have been conducted on the natural images obtained from a variety of natural environments to test the effects. The results show that the algorithm can effectively extract the main colors in a natural image and the main colors display the representative color features in the original image in a better way.

Key words: natural image; main color; adaptive extraction; K-means clustering algorithm; silhouette contour factor

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