

应用

基于JPEG双量化特性的彩色伪造图像盲检测

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摘要:

现有的盲检测方法主要针对灰度图像和未压缩图像, 很多算法都不能有效地检测彩色压缩伪造图像。本文提出了一种利用JPEG双量化失真特性实现彩色压缩伪造图像盲检测的方法。通过分析伪造图像的制作过程, 可知由多幅JPEG图像拼接成的高质量彩色伪造图像中篡改区域和背景区域经历的双量化过程不同。根据这一特性, 本文首先使用背景区域的初始量化表估计值对待检测图像进行再压缩处理, 定义再压缩后图像各颜色分量的失真函数; 然后根据各失真函数在图像不同区域的取值, 由各颜色分量分别确定篡改区域; 最后综合彩色图像各颜色分量的检测结果, 最终识别出彩色图像篡改区域的位置和大小。仿真结果表明该方法不但可以有效地识别彩色伪造图像的篡改区域, 而且比基于单一颜色分量的检测方法更加准确。

关键词: 彩色伪造图像; JPEG双量化; 盲检测; 量化表不一致

Blind Detection of Color Forgeries using Double JPEG Quantization Properties

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Abstract:

The fact that lots of color JPEG images are manipulated and altered has made it more and more important to identify the color image forgeries. Many image detection methods are proposed for gray and uncompressed images and most of them can't identify these compressed color forgeries effectively. In reaction to the phenomenon this paper presents a passive-blind approach to detect spliced color image forgeries based on distortion properties after double JPEG quantization. By analyzing the process of manufacturing forgeries, we got the point that different regions in high-quality color forgeries which are composed from different JPEG images have different distortion due to different double quantization process. So we compress the forgeries again using the estimated initial quantization tables of the background area firstly. Then, we define the distortion function for each color-component in the recompressed images. By analyzing the value of each function in different areas in the processed images, we can confirm different tampered areas corresponding to different color components. We synthesize the testing results of all the color components and confirm the dimension and the position of the tampered area. The simulation results show that the approach is very effective in detecting the tampered area of the color image forgeries and is better than the way based solely on a color component.

Keywords: color forgery double JPEG quantization blind detection; different quantization tables

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