工程与应用

一种印刷品数字水印防伪方法

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摘要　　随着高分辨率扫描印刷设备的出现，印刷品的版权保护成为重要的研究课题．在分析图像经历正版与盗版印刷过程后几何和象素点失真情况的基础上，提出一种基于数字水印技术的印刷品防伪方法．该方法先将水印嵌入到具有几何不变性的Fourier-Mellin域中，以削弱正版印刷过程中的几何失真对水印的破坏；再利用Radon变换对由扫描印刷品所获得的图像进行矫正，并从图像中提取嵌入的水印信息；由于正版和盗版印刷过程对水印的破坏程度区别明显，该方法最终通过计算水印提取的正确率来度量这种破坏，并将其与预先制定的阈值进行比较来判定印刷品的正伪．实验表明，文中提出的半脆弱水印算法克服了已有印刷品防伪水印方法只考虑水印鲁棒性的不足，可用于各类印刷品的版权保护．

关键词　　数字水印　印刷品防伪　Fourier-Mellin域　Radon变换

分类号

An Anti-counterfeit Strategy for Presswork Based on Digital Watermark Technology

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Abstract

　With the emerging of high-resolution scanner and printer, the study of copyright protection for presswork becomes an important research realm. Based on analyzing the geometric and pixel value distortion of the image scanned from legal and pirated versions of presswork respectively, we propose a digital semi-fragile watermark based copyright protection method. The method first embeds watermark into the geometric invariant Fourier-Mellin domain of an image to weaken the geometric distortion, brought by printing process, of the watermark in presswork, and the image is then used to create presswork via a legal printing process. Secondly, the method rectifies rescanned image from the presswork by using Radon transformation and the embedded watermark in it is detected. Since there is an obvious difference between the destruction degrees of the watermark caused respectively by legal and pirated printing process, we can judge whether a copy of presswork is valid or not just by computing the ratio of the successfully derived watermark and comparing it with a predefined threshold. The experiments show that our method overcomes the shortcoming of the existing algorithms and can be used in copyright protection of various presswork.

Key words　 Digital watermark　 Anti-counterfeit technology　 Fourier-Mellin Domain　 Radon transformation

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