

## 基于奇异值分解和Contourlet变换的图像水印算法

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摘要:

摘要: 目的: 提出一种基于奇异值分解和Contourlet变换的数字图像零水印算法。方法: 分析了Contourlet变换的基本原理和变换特点,提出了基于Contourlet变换嵌入式编码的方法,原始图像经过Contourlet变换后,根据每块奇异值的大小特性植入和提取已Arnold置乱后的水印。实验结果表明,该算法能够在满足不可见性条件下抵抗加噪和剪裁等攻击,具有较强的鲁棒性和不可见性,提高了水印识别的可靠性。

关键词: 数字水印; Contourlet变换; Arnold置乱; 奇异值分解

## Image watermarking algorithm based on singular value decomposition and Contourlet transform

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**Abstract:**

**【Abstract】** Objective: An image watermarking algorithm was proposed based on singular value decomposition and contourlet transform. Methods: This paper discusses principles and characteristic of Contourlet transform and proposes an embedded image compression method based on Contourlet transform. After the contourlet transform the Arnold scrambled watermark is embedded and extracted from every block of image. Experimental results show that the algorithm has a good transparency of embedded watermark image and is robust against attacks such as noise and crop. The reliability of watermark extraction was enhanced.

**Keywords:** digital watermark; Contourlet transform; Arnold scrambling; SVD

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