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论文

# 基于RBF神经网络的彩色图像盲水印算法

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摘要:

利用径向基函数神经网络(radial basis function, RBF)把水印嵌入到彩色图像的DCT(discrete cosine transform)域.首先把原始图像从RGB空间变换到YCrCb颜色空间,使得水印的嵌入更加符合人的视觉特性;然后将色度分量(CrCb)进行二维DCT变换,将水印通过量化的方式嵌入到CrCb的直流成分中,以提高水印的不可见性和鲁棒性;嵌入水印的时候,使用密钥来控制水印在图像的嵌入位置,来增强水印的安全性;最后,利用RBF来训练模拟量化的逆过程,借助训练得到的RBF神经网络来完成嵌入和提取水印,进一步提高水印鲁棒性.仿真试验表明该方法在保证了很好的不可见性的同时,使水印对于常见的图像水印攻击都具有良好的鲁棒性.

关键词: 数字水印 彩色图像水印 RBF神经网络 YCrCb颜色空间

# The blind color image watermarking algorithm based on the RBF neural networks

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Abstract:

A new blind watermarking scheme for color image was proposed. In this scheme, a binary logo watermark was embedded into the discrete cosine transform (DCT) domain of the color image with the help of radial basis function (RBF) neural networks. According to HVS, the original image was transformed from the RGB color space to the brightness and chroma (YCrCb) space. In order to strengthen the imperceptibility and robustness, the watermark was embedded into the DC coefficient of 8×8 blocks in CrCb chroma components. A key was set to select blocks where the watermark was embedded, which can improve the security of the watermark. Also, RBF was used to learn and approximate the inverse procedure of quantization, and watermark embedding and extraction was performed with the trained neural network to further improve the robustness. Simulations show that the proposed method has good imperceptibility as well as robustness to common image processing attacks.

Keywords: digital watermark color image watermark RBF neural network YCrCb color space

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