

Separable Reversible Data Hiding in Encryption Image with Two-Tuples Coding

ABSTRACT

Separable Reversible Data Hiding in Encryption Image (RDH-EI) has become widely used in clinical and military applications, social cloud and security surveillance in recent years, contributing significantly to preserving the privacy of digital images. Aiming to address the shortcomings of recent works that directed to achieve high embedding rate by compensating image quality, security, reversible and separable properties, we propose a two-tuples coding method by considering the intrinsic adjacent pixels characteristics of the carrier image, which have a high redundancy between high-order bits. Subsequently, we construct RDH-EI scheme by using high-order bits compression, low-order bits combination, vacancy filling, data embedding and pixel diffusion. Unlike the conventional RDH-EI practices, which have suffered from the deterioration of the original image while embedding additional data, the content owner in our scheme generates the embeddable space in advance, thus lessening the risk of image destruction on the data hider side. The experimental results indicate the effectiveness of our scheme. A ratio of 28.91% effectively compressed the carrier images, and the embedding rate increased to 1.753 bpp with a higher image quality, measured in the PSNR of 45.76 dB.