

IMAGE STEGANOGRAPHIC SCHEME BASED ON REVERSIBLE AND INVERSE EMBEDDING STRATEGIES

Udeshika T. Tilakaratne

Postgraduate Institute of Science

University of Peradeniya,

Peradeniya,

Sri Lanka.

A steganographic scheme undetectably alters a cover object to embed a secret message. The cover object can be text, image, audio, video, etc. In image steganography, the image that is used to carry the secret data is referred to as the cover image and the image that carries the secret data is referred to as the stego image. Reversible data embedding is a technique that not only embeds data into cover images, but also restores the cover images from the stego image after the secret data have been extracted. This is necessary in some cases such as military images or medical images where images themselves might be extremely important and any distortion cannot be allowed. In inverse embedding, the embedding strategies used in the first and second embedding phases are inverses of each other. Some distortion which was produced in the first phase can be balanced out in the second phase.

The work presented suggests an image steganographic scheme based on reversible data embedding technique for commonly used image file formats and for different image types. The proposed scheme uses one pixel pair to embed one bit of secret data and the maximum pixel value difference between the cover image and stego image will be 1 irrespective of the amount of secret data that is embedded. The technique promotes maximization of payload, allows error-free recovery of embedded data, and provides the exact recovery of the original image upon extraction of the embedded information.

The experimental results show that the proposed reversible steganographic scheme achieves good visual quality and high embedding capacity. Specifically, with the five-layer embedding, the Peak Signal to Noise Ratio (PSNR) value for 8-bit grayscale images is greater than 53 dB and for RGB color images is greater than 55 dB.

