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MULTIPLE LAYER IMAGE STEGANOGRAPHIC SCHEME BASED ON REVERSIBLE DATA EMBEDDING STRATEGY

U. T. Tilakaratne¹, U. A. J. Pinidiyaarachchi²

¹*Postgraduate Institute of Science, University of Peradeniya*

²*Department of Statistics and Computer Science,
Faculty of Science, University of Peradeniya*

A steganographic method undetectably alters a cover object to embed a secret message. The cover object can be text, image, audio, video, etc. In case of image, 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 stego image. To send the secret data, the sender embeds the secret data into the cover image by modifying the pixel value to get the stego image and sends the stego image to the receiver. Once the receiver receives the stego image, the secret data can be extracted from it. Reversible (or Lossless) data hiding 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 has 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.

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, such as, gray scaled (8-bit, 16-bit, 32-bit) and colour (8-bit, RGB). 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 53dB and for RGB colour images is greater than 55dB.