

## A weight-based data hiding method for binary image using selective binary numeral system

Huang Po-Hsian \*

*Department of Computer Science and Information Engineering*

*Yuanpei University*

*No. 306, Yuanpei Street*

*Hsin Chu 30015*

*Taiwan, R.O.C.*

---

### Abstract

Arbitrary permutations of binary data in steganography are easily detected because a binary image is represented merely in one bit, and therefore many researchers often use the edges in object images to hide data, using one or multiple mapping tables or templates to determine where to do the embedding.

In this study, we propose an easy way of better steganography, segmenting the images into non-overlapped  $2 \times 2$  blocks, and using the simple odd-even parity to determine the location for the embedding, while we also attend to the problem of image quality, using four selective bits of binary numeral system (or base-2 system) to generate a weighted value to determine the best embedding location, thus achieving the purpose of maintaining the image quality and reducing the calculation complexity. The secret data are first converted into bit streams, with their sequential order scrambled using *pseudo-random generator* (PRNG), and are either reversed or marked prior to being hidden at locations previously determined. The extraction of the hidden data merely requires the determination of the odd-even number the  $2 \times 2$  blocks of the object stego-images, and the original binary bit stream data in their original sequential order can be retrieved using the PRNG previously applied in the embedding. By the experimental results, the method proposed in this study proves to be valid in dealing with the problems of capacity and image quality, while providing a method that allows free choice of two embedding mechanism for the optimal results of image quality.

---

*Keywords* : *steganography, binary image, data hiding.*

### 1. Introduction

With the advent of digital era and the advancement of information technology and telecommunication techniques, many things in our everyday life are done electronically and digitally. People send messages,

---

\*E-mail: [pshuang@mail.ypu.edu.tw](mailto:pshuang@mail.ypu.edu.tw)

*Journal of Discrete Mathematical Sciences & Cryptography*

Vol. 13 (2010), No. 5, pp. 429–444

© Taru Publications