**High Capacity Image Steganography**

**]in Wavelet Domain**

**Synopsis**

A new high capacity method for transform domain image steganography is introduced in this paper. The proposed steganography algorithm works on the wavelet transform coefficients of the original image to embed the secret data. As compared to current transform domain data hiding methods, this scheme can provide a larger capacity for data hiding without sacrificing the cover image quality. This is achieved through retaining integrity of the wavelet coefficients at high capacity embedding. This improvement to capacity-quality trading-off interrelation is analyzed in detailed and experimentally illustrated in the paper.

**INTRODUCTION**

Information hiding has attracted lots of attention over recent years. It is the art and technique of concealing a message in a cover without leaving any remarkable trace on the cover signal . There are three main compromising attributes for a data hiding system, known as capacity, imperceptibility, and robustness. The data hiding schemes are principally categorized into *steganography* and *watermarking*, according to the application based requirements. In the steganography systems, our goal is to provide more capacity, where a better robustness characteristic is of concern in watermarking. The capacity requirements are often satisfied with techniques in spatial domain, where transform domain techniques provide higher robustness against changes and attacks.

Accordingly, majority of non-fragile watermarking algorithms use transform domain techniques because of their critical need for robustness, while spatial domain hiding methods are more attractive in steganography schemes due to the capacity concerns. Despite this general trend, the vast use of the compressed images over the internet and in most multimedia communications have encouraged researchers to challenge the issue of hiding capacity in transform domains, e.g. DCT (Discrete Cosine Transform) and wavelet transforms, for image steganography. This is the main theme of the current paper. JPEG2000, which is a recent image compression standard, utilizes the wavelet transform. In addition to two general benefits for transform domain techniques mentioned above, the wavelet transform has the additional advantage of being more compatible with the HVS (Human Visual System). Therefore, there is an increasing tendency to developing information hiding algorithms in wavelet domain. These methods, as mentioned earlier, have a limited capacity and are more suitable for image watermarking . However, there are few steganography schemes developed in wavelet domain.

**Block diagram**



 **Figure. 2-level 2D wavelet transforms**

**Reference**

[1] D. Artz, “Digital steganography: hiding data within data,” IEEE Internet Computing, pp.75-80, May-June 2001.

[2] L. Sunil, C.D.Yoo, T.Kalker, “Reversible Image Watermarking Based on Integer-to-Integer Wavelet Transform”, IEEE Transaction of information, forensics and security , September 2007.

[3] T. G. Gao, Q. L. Gu, “Reversible watermarking algorithm based on wavelet lifting scheme,” Wavelet analysis and pattern recognition conference, November 2007.

[4] N. Bi, Q. Sun, D. Huang, Z. Yang and J. Huang, “Robust watermarking based on multiband wavelets and empirical mode decomposition,” IEEE transaction on image processing, August 2007.

[5] S. E. El-Khamy, M. Khedr, A. AlKabbany, “A hybrid fractal-wavelet data hiding technique” 25th NRCS, March 2008.