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Data Secured Using Distributed Source Coding

KEYWORDS: stego-image, encoded, decomposition, low-pass wavelet, distributed source coding

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ABSTRACT *The privacy and security of data are important. Ideally, propose a compression scheme for stego-image, by using distributed source coding. Two or more corrupted versions of images are encoded separately after combined that for decoding. Our approach results in twofold. i) use of decomposition of low-pass wavelet coefficients for creating the Side Information, and ii) variable length coset creation by estimating the bit-rate of the cosets on the encoder using the joint distribution statistics of the Original image and the side info. The proposed scheme, to make secure for our data and reduce the storage of space. The Experimental results have shown that for secure information by using DSC.*

1. INTRODUCTION

The Greek word "steganos" meaning covered writing is basically the concept behind the theory of steganography. Here it is difficult to even detect that a message is being sent. This type of ciphering called steganography, the ancient art of hiding messages sent undetectable. This methodology is gaining popularity with everyday passing because of its unique properties and those days are not far off when it would be adopted by armies of the world for secret message passing. The history of sending hidden message is very old. Greeks used it writing message on some material and later covering it with wax, tattooing messages on bald head, later growing hair to cover it up. In World War II invisible inks were used to write messages in between the lines of normal text message [1]. World War II saw the use of microdots by Germans. In microdots technology, photograph of secret message taken was reduced to size of a period. This technology was called "the enemy's master piece of espionage" by FBI director J. Edgar Hoover [1]. Normal and innocent messages carrying secret messages moved from one place to another.

2. IMAGE STEGNOGRAPHY

There are currently three effective methods in applying Image Steganography:

LSB Substitution, Blocking, and Palette Modification [2]. LSB (Least Significant Bit) Substitution is the process of modifying the least significant bit of the pixels of the carrier image. Blocking works by breaking up an image into "blocks" and using Discrete Cosine Transforms (DCT). Each block is broken into 64 DCT coefficients that approximate luminance and color—the values of which are modified for hiding messages. Palette Modification replaces the unused colors within an image's color palette with colors that represent the hidden message. [1] We have chosen to implement LSB Substitution in my project because of its ubiquity among carrier formats and message types. With LSB Substitution we could easily change from Image Steganography to Audio Steganography and hide a zip archive instead of a text message.

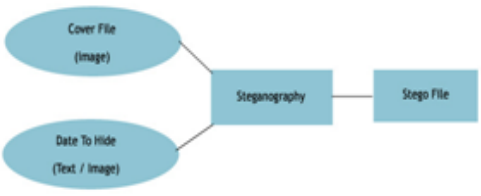

Fig.2 Processing of Hiding data

3. RELATED WORKS

The application of distributed source coding techniques on still images are not trivial, because the image should be divided into two sources X1, X2 which are encoded separately. In this paper, the low-pass component of the discrete wavelet composition of the image is used as X2. For X1, a modulo based binning that has error correcting capabilities on edge boundaries is used. Instead of classical source encoding of X1, the pixel values are grouped into bins based on a modulo operation, and decoder ends the value of the syndrome that is closest to the X2. The efficient distributed coding technique for still images, using discrete wavelet transformation as the side information and modulo generation as the generation of the cosets. Consider the sensor communication [7] in Fig. 3. The input sensors observe the noisy version of the true data X, which are X1 and X2 respectively. After the separately encoding of the two noisy observations, the central receiver decodes the two sources jointly.

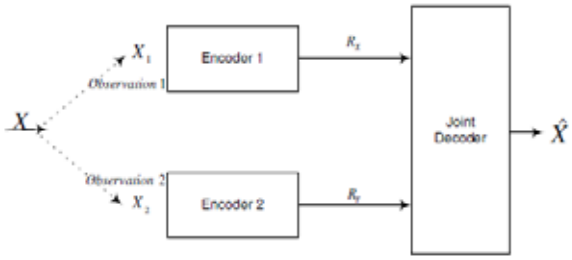

Figure 3: Distributed Source Coding Scheme of the proposed method. Two noisy version of the image are encoded independently and decoded jointly.

4. ARCHITECTURE

The proposed encoding and decoding system for still images, exploiting Distributed Source Coding can be seen in Fig. 4. A similar system is presented in [8] as a syndrome based distributed coding of image. Note, however, that the proposed system does not use the true pixel values for encoding and decoding of the Side Information (SI). Instead, the low-pass frequency components of the image are utilized. Moreover, the proposed a variable-length coset creation in order to improve the Peak Signal to Noise Ratio (PSNR) of the decoded image, especially on the edge contours.

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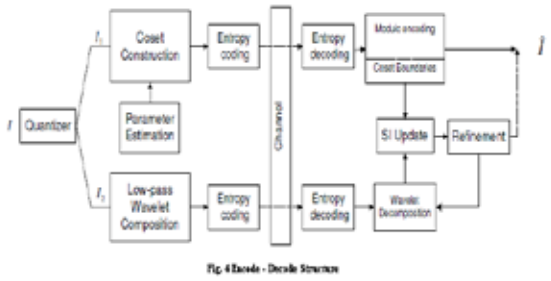

Let I (M; N) is an MN gray level image matrix which has integer pixel values within the range of 0 and 255. î is a vector version of the image length MN. The î is constructed by a snake scanning of the image matrix as

$$\vec{I}(z) = \begin{cases} I(x,y) & x \text{ is odd} \\ I(x,N+1-y) & \text{otherwise} \end{cases}$$

5. DISTRIBUTED SOURCE CODING

5.1 Side Information

Side Information (SI) is known as the information encoded-Parallel with the syndromes, and be used at the decoder in order to estimate the. I with the help of received syndromes. In the proposed scheme, the information encoded as parallel will be re_ned at the decoder by using the extra information coded within the cosets. Hence we de_ned the encoding process as Pre-SI. The quantized version of the image Iq is composed into its wavelet coefficients. In our case, a 2 level of 7=9 alter set is used. However, note that in each level of wavelet composition, only the lowest parts of the coef_cients are calculated. The rest of the composition coefficients need not to be calculated, hence reduces the computational complexity of the encoder. The visualization of the SI that is computed in the encoder can be seen in Fig. 5, such that the number of Low-Low coefficients of the Pre-SI (Iz LL) is only 1=16th of the size of the original image. The values of Iz LL are then encoded by arithmetic coding in order to reduce the cost of the transmission rate R2.

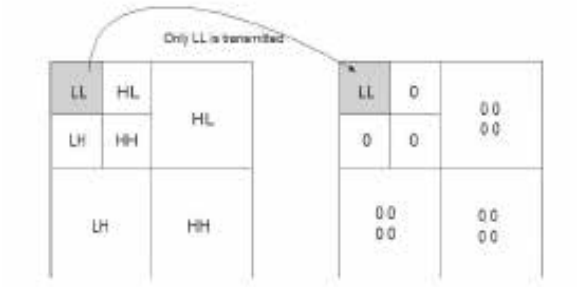

Figure 5: Construction of the Side Information. The Low-Low wavelet composition of the second level is transmitted only. Decoder reconstructs the side information by setting all other coefficients to 0

5.2 Coset Creation

In distributed coding approach, the possible input values are grouped into bins and instead of coding the input values, their corresponding bins are transmitted. Receiver chooses the value that is closest to the value of the SI. The proposed coset creation is similar to the [8]. However, in the proposed method, variable-length cosets are created to improve the quality of the image at the edge boundaries.

6. SYSTEM FLOW CHART

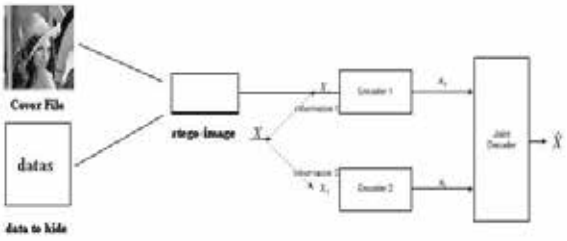

Figure 6.Stego-image decoded with distributed source coding.

The process of steganography is classified into two major parts. They are Secret file: Which information going to hide behind the cover file.

Cover file: Hide the information by using some other file called cover file that is, here we used image file as cover file in this process.

Stego-image applied to distributed source coding for compression.

7. CONCLUSION

In this paper, propose a compression scheme for stego-image, by using distributed source coding. Two or more corrupted versions of images are encoded separately after combined that for decoding. Our approach results in two-fold. i) use of decomposition of low-pass wavelet coefficients for creating the Side Information, and ii) variable length coset creation by estimating the bit-rate of the cosets on the encoder using the joint distribution statistics of the original image and the side info. The proposed scheme, to make secure for our data and reduce the storage of space. The Experimental results have shown that for secure information by using DSC.

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