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CALCULATION OF LUMINANCE FOR DATA-HIDING AND IMAGE COMPRESSION

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Abstract **- There are many digital multimedia transmissions on the network. Therefore to protect the secret messages during transmission becomes an important issue. To guarantee communication efficiency and save network bandwidth compression techniques can be implemented to reduce redundancy and the quality of the decompressed versions should also be preserved. The proposed system is a joint data hiding and compression scheme the system helps to avoid the risk of the attack from interceptors and increase the implementation efficiency .The proposed joint data hiding and compression is based on SMVQ (side match vector quantization) and image inpainting.**

Keywords - Luminance, Data hiding, image compression.

I. INTRODUCTION

As multimedia and the internet technology have become popular, people can transmit and share digital content with each other conveniently. The problem of protecting transmitted media has become more important. The fundamental goal of image compression is to reduce the bit rate for transmission or data storage while maintaining image quality. Nowadays, most digital content, especially digital images and videos are converted into the compressed forms for transmission. Another important issue in an open network environment is how to transmit secret or private data securely. Even though traditional cryptographic methods can encrypt the plaintext into the ciphertext the meaningless random data of the ciphertext may also arouse the suspicion from the attacker. To solve this problem, information hiding techniques have been widely developed in both academia and industry, which can embed secret data into the cover data imperceptibly. Due to the prevalence of digital images on the Internet, how to compress images and hide secret data into the compressed images efficiently deserves in-depth study.

Recently, many data-hiding schemes for the compressed codes have been reported, which can be applied to various compression techniques of digital images, such as JPEG, JPEG2000 and vector quantization (VQ). As one of the most popular lossy data compression algorithms, VQ is widely used for digital image compression due to its simplicity and cost effectiveness in implementation. During the VQ compression process, the Euclidean distance is utilized to evaluate the similarity between each image block and the codewords in the codebook. The index of the codeword with the smallest distance is recorded to represent the block. Thus an index table consisting of the index values for all the blocks is generated as the VQ compression codes. Instead of pixel values, only the index values are stored, therefore, the compression is achieved effectively. The VQ decompression process can be implemented easily and efficiently because only a simple table lookup operation is required for each received index. In this work, we mainly focus on the data embedding in VQ-related image compressed codes. Side match vector quantization (SMVQ) was designed as an improved version of VQ. The concept of image inpainting is inherited from the ancient technique of manually repairing valuable artworks in an undetectable manner. Inpainting for digital images has found applications in such areas as repairing of damaged photographs, filling in or removing chosen areas, and wiping off visible watermarks. Image inpainting can generate or create image regions that initially do not exist at all based on the useful information in the close neighbourhood. Currently, there are mainly three classes of the image inpainting methods; partial differential equation (PDE) based methods, interpolation-based methods and patch-based methods.

II.METHODOLOGY

2.1. System Design

Following block diagram gives a detailed description of the working of the system. First, the image gets divided into n x n blocks, where the topmost row and leftmost column is compulsorily compressed using VQ. The leftover blocks are compressed using SMVQ and image inpainting according to the mean square error (MSE) value. If the compression is done using SMVQ or inpainting, then watermark bits are added to the block. After this, during the decompression, the indicator bit is checked if it is 0 or 1. If it is 0, then the decompression is directly done using VQ and no watermark bit is extracted. If the indicator bit is 1, then the index values of the segments in the section are checked and compared with the codewords. Accordingly, the technique of SMVQ or inpainting is used for decompression and the appropriate watermark bit (0 or 1) is extracted. And the output is in the form of the original image.

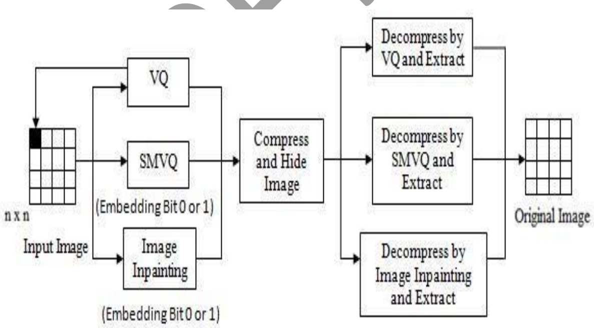

Fig.1Block Diagram of the Methodology

For all the residual blocks, except those in the topmost row and the leftmost column, a mean square error (MSE) value or distortion value is calculated and this value is then compared with a threshold value. If this MSE is greater than the threshold value, then the block is directly compressed using the VQ index. And if the MSE is less than or equal to the threshold value, then the embedded watermark bit is checked. If the embedded watermark bit is 0, then it is clear that the block is compressed using SMVQ index and if the embedded watermark bit is 1, then it can be said that image inpainting is used for compression. Thus, the blocks in the image are compressed by adaptively using VQ, SMVQ or image inpainting.

In the system design first read the input image which is group of gray-level image to verify the effectiveness of proposed scheme. Second step is taking luminance component of the image; Luminance is apparent brightness, how bright an object appears to the human eye. It gives a measure of the amount of energy an observer perceives from light source. To measure the range of brightness of tones in our image, to help in setting shadow and highlight points. But absolute brightness is not very meaningful, because human eyes don't detect brightness linearly with color. Basically, we see Green as brighter than Blue. So, the term Luminance was invented, which is brightness adjusted to indicate appropriately what we really see. Luminance is Gray tone values computed from RGB via the formula: RGB Luminance value = 0.3R+ 0.59 G + 0.11 B

III.CONCLUSION & FUTURE WORK

Luminance gives a measure of the amount of energy an observer perceives from light source. A joint data-hiding and compression (JDHC) concept can integrate the two functions of data hiding and image compression into a single module, which can avoid the risk of attack from interceptors and increase the implementation efficiency, recovery quality. The proposed joint data-hiding and compression scheme is based on SMVQ and image inpainting. The system compare the compression ratio and peak signal to noise ratio. Compression ratio is reducing the amount of data required to represent an image or reducing no. of bits required to represent an image. It is the ratio of size of original image to the size of compressed image. Peak signal to noise ratio is most commonly used to measure the quality of reconstruction of lossy compression codec's. It is ratio between maximum possible power of signal and power of corrupting noise that affects the fidelity of its representation. Further we are going to use image inpainting for compressing the image.

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