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A Survey on Data Hiding and Compression Schemes

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ABSTRACT: Data hiding has a vital role to play in information security. Using a data hiding technique, secret information is hidden into cover digital content. Compression techniques and data hiding techniques received much less attention from the research community and from industry than cryptography. In past research many data hiding and image compression techniques has been developed, it works independent module in both sender and server side. These method cause low efficiency, less security and also the low bit rate scheme requires more time to encode. Both image compression and data hiding (EJDHC) using residual codebooks with side match vector quantization (SMVQ). In this survey is to discuss on data hiding schemas and compression techniques such as JPEG, JPEG 2000, vector quantization, VQ compression and SMVQ.

KEYWORDS: Data hiding, image compression, side match vector quantization

I.INTRODUCTION

Data hiding is a process to hide data into cover media. The data hiding process links two sets of data and a set of the embedded data and another set of the cover media data. The relationship between these two sets of data characterizes different applications. In authentication phase embedded data are closely related to the cover media. High Data hiding in images [1] 8-bit grayscale images are selected as the cover media called as cover images. Cover images with the secret messages embedded in the images. For data hiding methods, the image quality refers to the quality of the images. Most of the hiding techniques is based on manipulating the least-signi7cant-bit (LSB) planes by directly replacing the LSBs of the cover image with the message bits. LSB methods typically achieve high capacity. Another technique introduced in [2] to improve image quality a local pixel adjustment process an optimal substitution matrix for the embedding of the secret messages. Image compression purpose is data reduction that can reduce the quantity of data. Image compression resolved the problem of reducing the amount of data required to represent an image. It is a process planned to yield a compact representation of an image by reducing the image storage. In Image compression has two ways lossy and lossless schemes Lossy schemes provide much higher compression ratios than lossless schemes. Lossy schemes are widely used since the quality of the reconstructed images is adequate for most applications. Lossless compression is used for medical imaging and arts. Data compression is being used for applications in image processing. In fact, very surprising we can see that many authors use data compression techniques for classification and / or segmentation images, filter or denoising image, artifacts detection in images, detecting altered images, etc.

Data hiding [6] also can be classified into three domains, namely, spatial, transformative, and compression. In the spatial domain each pixel in the cover image is modified to hide the secret information. In the transformative domain the cover image is transformed into coefficients using well-known transform techniques the integer wavelet transform and the integer discrete cosine transform. Then to embed the secret information, these coefficients are altered. In the compression domain, the cover image is compressed to save the storage and the bandwidth space of the embedded image. Then, the image-compressed codes are processed to hide the secret information. Many image-compressed data hiding schemes have been noted in the literature because the sizes of the compressed images will be much smaller than those of the original images before and after data hiding. Various compression techniques JPEG block truncation

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coding (BTC) , vector quantization (VQ) and side-match vector quantization (SMVQ) have been utilized for data hiding to obtain both a low compression rate and high embedding capacity.

Vector quantization (VQ) [3]approach is spatial domain image compression methods. VQ is a lossy compression method that uses codeword indices to represent images, where the code words are taken from a common codebook that contains the proper number of code words. When an image is to be compressed by the VQ system, the image is first partitioned into non-overlapping blocks and each block is mapped to the closest codeword in the codebook. The SMVQ [3] method predicts an input block by using the adjacent values from its upper and left blocks to form a temporary codeword. The temporary codeword is used to select a part of code words from the main codebook to form a state codebook. Normally, the size of state codebook is smaller than the main codebook. Thus, using state codebook to encode a block can further reduce the size of compression code. In this review focused on data hiding schemas and compression techniques such as JPEG, JPEG 2000, vector quantization, VQ compression and SMVQ

II. REVIEW ON JPEG

Joint photographic expert group (JPEG) [4] is a famous file for images. It applies the discrete cosine transformer (DCT) to image content transformation. DCT is a widely used tool for frequency transformation. If we apply JPEG images to data hiding, the stego-image will not easily draw attention of suspect. There is a JPEG hiding-tool Jpeg-Jsteg. In the Jpeg-Jsteg embedding method, secret messages are embedded in the least signification bits (LSB) of the quantized DCT coefficients whose values are not 0, 1, or) 1. The main drawback of Jpeg-Jsteg is less message capacity. This is because, after the DCT transformation and quantization of JPEG, the coefficients are almost all zero and cannot hide messages according to the definition of Jpeg- Jsteg. To improve the message capacity of Jpeg-Jsteg, a new data hiding method based on JPEG and quantization table modification is proposed.

III. JPEG 2000

The JPEG 2000 standard a new image coding scheme using state of the art compression technique based on wavelet technology. Its architecture is useful for many diverse applications, including Internet image distribution, security systems, digital photography, and medical imaging.

IV. JOINT DATA-HIDING AND COMPRESSION SCHEME

Joint data-hiding and compression (JDHC) concept and integrate the data hiding and the image compression into a single module seamlessly, which can avoid the risk of the attack from interceptors and increase the implementation efficiency. JDHC scheme[5], rather than two separate modules only a single module is used to realize the two functions image compression and secret data embedding, simultaneously. The image compression in our JDHC scheme is based mainly on the SMVQ mechanism. According to the secret bits for embedding, the image compression based on SMVQ is adjusted adaptively by incorporating the image in painting technique. After receiving the secret embedded and compressed codes of the image, one can extract the embedded. secret bits successfully during the image decompression

V. VQ COMPRESSION

VQ compression method [3] is a powerful and simple image compression method. However, the performance of compression rate can be further improved. Therefore, many improved versions that consider the relationships among neighboring blocks.

VI. SIDE-MATCH VECTOR QUANTIZATION (SMVQ)

Vector quantization (VQ) is a compression technique which is developed by Gray in 1984 to compress an image file. Since VQ is a simple and efficient lossy compression scheme, it is widely applied in image processing and signal processing. VQ looks for the nearest codeword of the input vector X from the finite subset $Y = \{Yi ; i = 1,2, \ldots, N\}$,where yi is called a codeword and the set Y is called a super codebook generated by the LBG algorithm. To find the nearest

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codeword of X, Euclidian distance functions. The SMVQ method [3] is to improve the performance of VQ in terms of compression rate and to alleviate block effect. Because the characteristic of natural images (i.e., the smooth area has similar pixel distribution), SMVQ encodes a current block by a codeword selected from a state codebook. Here, the state codebook is constructed by selecting some code words from the main codebook. Based on this concept, in SMVQ the first row and first column blocks are encoded using the traditional VQ process, and the residual blocks are encoded by VQ or SMVQ. The first row and first column blocks must be encoded accurately because these blocks are used to predict the residual blocks. If an error occurs in the encoding phase, it will propagate throughout the entire image. In essence, the main codebook is generated by LBG algorithm just as with traditional VQ, and the sender and receiver share the same main codebook during the encoding and decoding phases. In case, if a block can be encoded by SMVQ, then a codeword with the smallest distance from the current encoding block is chosen from the state codebook to represent the current block. Obviously, the state codebook can be different for each block in an image. Because the sender and receiver have the same main codebook and the state codebook generating procedure, thus the decoding can successfully reconstruct the image

VII. CONCLUSION

In this survey discussed data hiding schemas and compression techniques such as JPEG, JPEG 2000, vector quantization, VQ compression and SMVQ. SMVQ with JDCH techniques are more suitable for effective data hiding due to good marked image quality, easy implementation. Discusses techniques to improve the hiding capacity and also improve the quality of image. SMVQ techniques can be simply designed by designing shifting and embedding functions. Combinations of various techniques can be done to get more efficient data hiding scheme.

REFERENCES

[1] H. W. Tseng and C. C. Chang, “High capacity data hiding in JPEG compressed mages,” Informatica, vol. 15, no. 1, pp. 127–142, 2004
[2] Ran-Zan Wang, Chi-Fang Lin, Ja-Chen Lin,”Hiding data in images by optimal moderately significant-bit replacement”, IEE Electron. Lett. 36 (25)(2000) 2069–2070
[3] C. C. Chang, T. S. Chen, and L. Z. Chung, “A steganographic method based upon JPEG and quantization table modification,” Inf. Sci., vol. 141, no. 1, pp. 123–138, 2002
[4] Chuan Qin, Chin-Chen Chang, Fellow, IEEE, and Yi-Ping Chiu ,”A Novel Joint Data-Hiding and Compression Scheme Based on SMVQ and Image Inpainting.”
[5] Thai-Son Nguyen 1,2, Chin-Chen Chang1,3, and Meng-Chieh Lin ,”Adaptive Lossless Data Hiding Scheme for SMVQ-Compressed Images using SOC Coding”
[6] C. H. Yang and Y. C. Lin, “Fractal curves to improve the reversible data embedding for VQ-indexes based on locally adaptive coding,” J. Vis. Commun. Image Represent. vol. 21, no. 4, pp. 334–342, 2010.
[7] Y. Linde, A. Buzo, and R. M. Gray, “An algorithm for vector quantization design,” IEEE Trans. Commun., vol. 28, no. 1, pp. 84–95, Jan. 1980.
[8] C. C. Chang and W. C. Wu, “Fast planar-oriented ripple search algorithm for hyperspace VQ codebook,” IEEE Trans. Image Process., vol. 16, no. 6, pp. 1538–1547, Jun. 2007.
[9] W. C. Du and W. J. Hsu, “Adaptive data hiding based on VQ compressed images,” IEE Proc. Vis., Image Signal Process., vol. 150, no. 4, pp. 233–238, Aug. 2003.