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Motion Vectors Used in Compressed Video

D Navya [1] S. Naga Lakshmi[2] D Keerthi [3] Dr Giridhar Akula[4]
[1, 2,3] Students of Malla Reddy Institute of Engineering and Technology, Mysammaguda.India
[4] Principal, Malla Reddy Institute of Engineering and Technology, Hyderabad[4]
seshagiridhar.a@gmail.com,navyadarba26@gmail.com

Abstract:-- In this paper we target the motion vectors used to encode and reconstruct both the forward predictive (P)-frame and bidirectional (B)-frames in compressed video. The choice of candidate subset of these motion vectors are based on their associated macro block prediction error, which is different from the approaches based on the motion vector attributes such as the magnitude and phase angle, etc. A greedy adaptive threshold is searched for every frame to achieve robustness while maintaining a low prediction error level. The secret message bit stream is embedded in the least significant bit of both components of the candidate motion vectors. The method is implemented and tested for hiding data in natural sequences of multiple groups of pictures and the results are evaluated. The evaluation is based on two criteria: minimum distortion to the reconstructed video and minimum overhead on the compressed video size. Based on the aforementioned criteria, the proposed method is found to perform well and is compared to a motion vector attribute-based method from the literature.

***Key words*: Least Bit significant, Hoffman code, stego system, Tomography, DCT ,**

1. INTRODUCTION

This paper targets the internal dynamics of video compression, specifically the motion estimation stage. Digital video refers to the capturing, manipulation, and storage of moving images that can be displaced on computer screens. This requires that the moving images be digitally handled by the computer. The word digital refers to a system based on discontinuous events, as opposed to analog, a continuous event. Computers are digital systems; they do not process images the way the human eye does.

2.PROBLEM STATEMENT

The main objective of this paper is explained with four objectives, explained as follows.

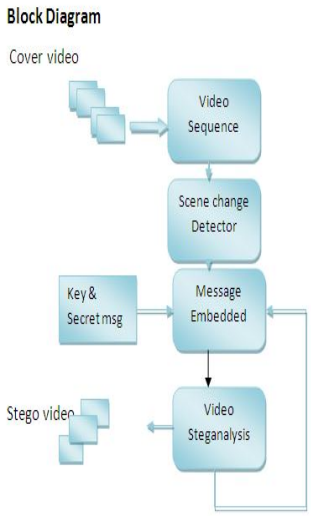
First objective is to compile an introduction to the subject of steganography. There exist a number of studies on various algorithms, but complete treatments on a technical level are not as common. Material from papers, journals, and conference proceedings are used that best describe the various parts.

The second objective is to search for algorithms that can be used to implement for the detection of steganographic techniques.

The third objective is to evaluate their performance. These properties were chosen because they have the greatest impact on the detection of steganography algorithms

In the below mentioned block diagram it has been specified to hide data in motion vector of video compression by using steganalytic system.

- The first is the looking scene that will hold the hidden information, called the cover image.
- The second file is the message – the information to be hidden



3.NEW METHOD PROPOSED

The secret message bit stream is embedded in the least significant bit of both components of the candidate motion vectors. By means of simple rules applied to the frame markers, we introduce certain level of robustness against frame drop, repeat and insert attacks.

- LSB Algorithm
- Embedding data, which is to be hidden, into an image requires two files.

Frame Separation:

Frame processing is the first step in the background subtraction algorithm, the purpose of this step is to prepare the modified video frames by removing noise and unwanted object's in the frame in order to increase the amount of information gained from the frame and the sensitivity of the algorithm.

Preprocessing is a process of collecting simple image processing tasks that change the raw input video info a format. This can be processed by subsequent steps. Preprocessing of the video is necessary to improve the detection of moving object's For example, by spatial and temporal smoothing, snow as moving leaves on a tree, can be removed by morphological processing of the frames after the identification of the moving objects as shown in the following figure

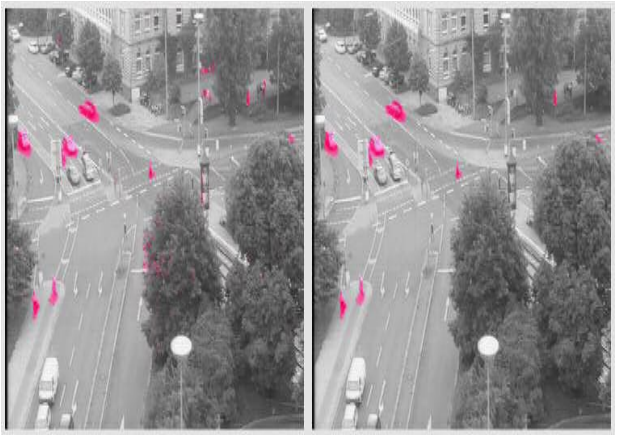


Figure 1: Morphological Processing

Another key issue in pre processing is the data format used by the particular background subtraction algorithm. Most of the algorithm handles luminance intensity, which is one scalar value per each pixel, however, color image, in either RGB or HSV color space, is becoming more popular in the background subtraction algorithms.

Image embedding method description:

Take any input video, and then convert that video in to number of frames. After converting user need to select any one of the frame for embedding the secret data. For hiding process we r going to use LSB technique. Embedded image is called as "Stego image" Then we are going to reconstruct that frames to videos.

Least-Significant-Bit (LSB) Matching Method

In order to keep the embedding of the same amount of information as LSB matching and detect the secret data harder than the conventional LSB matching method, Mielikainen proposed a robust LSB matching method in 2006.

$$f(l-1,n) \neq f(l+1,n), \forall l,n \in Z.$$
$$f(l,n) \neq f(l,n+1), \forall l,n \in Z.$$

Therefore, embedding message is performed for two pixels X and Y of a cover image at a time and then adjusting one pixel of the (X, Y) to embed two secret bits message s1s2.The embedding procedure is described as following:

Step 1. If the LSB of X is the same as s1, go to step 2.
Otherwise, go to step 3.

Step 2. If the value of f (X, Y) is the same as s2, do not change any pixel. Otherwise, the value of pixel Y is increased or decreased by 1.

Step 3. If the value of f (X −1, Y) is the same as s2, the value of pixel X is decreased by 1. Otherwise, the value of pixel X is increased by 1.
Where the function f (X, Y) is defined as Eq.1:

$$f(X',Y') = LSB\left(\left\lfloor \frac{X'}{2} \right\rfloor + Y'\right)$$

Since this new LSB matching method just only increase or decrease 1 in two adjacent pixels, the difference of the two neighborhood pixel between cover image and stego-image is very small. Hence, it can keep high quality while hiding data.

Discrete Cosine Transform:

DCT coefficients are used for JPEG compression. It separates the image into parts of differing importance. It transforms a signal or image from the spatial domain to the frequency domain. It can separate the image into high, middle and low frequency components.

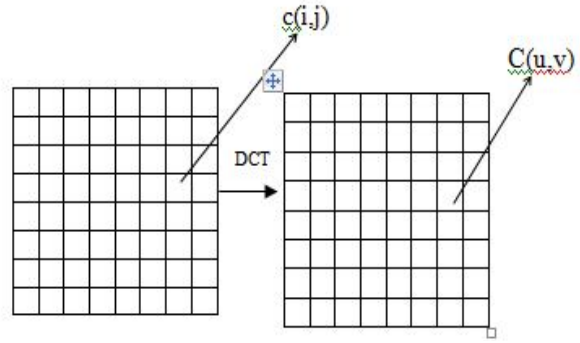


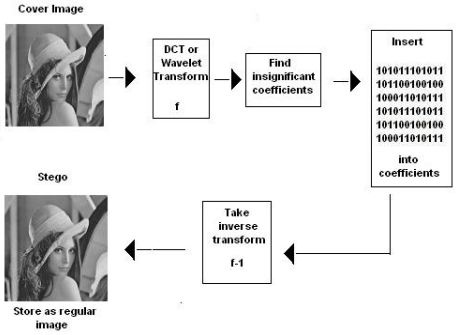
Figure. 2 : Discrete Cosine Transform of an Image

Procedure for DCT used in Steganography

Image is broken into 8×8 blocks of pixels. Working from left to right, top to bottom, the DCT is applied to each block.

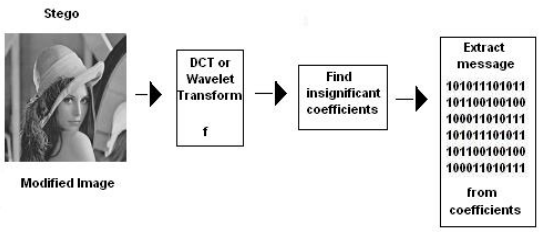
Each block is compressed through quantization table to scale the DCT coefficients and message is embedded in DCT coefficients.

Procedure to Encode the Hidden Data



- Take the DCT or wavelet transform of the cover image
- Find the coefficients below a certain threshold
- Replace these bits with bits to be hidden (can use LSB insertion)
- Take the inverse transform
- Store as regular image

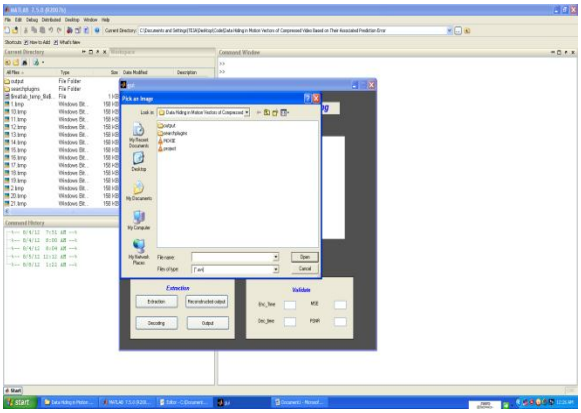
To Decode the Hidden Data:



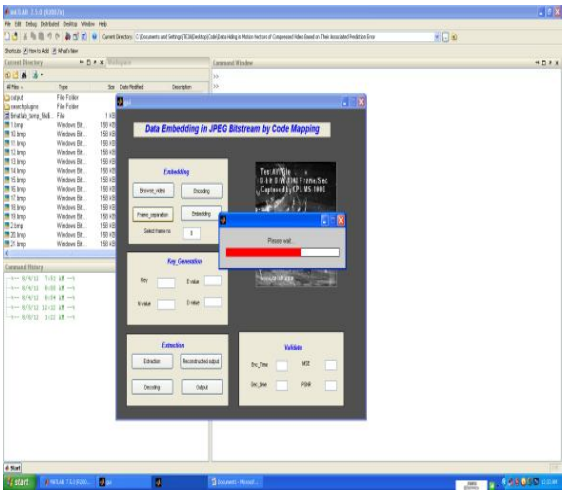
- Take the transform of the modified image
- Find the coefficients below a certain threshold
- Extract bits of data from these coefficients
- Combine the bits into an actual message

I. Experimental Results

1. Input video by selecting browse video option



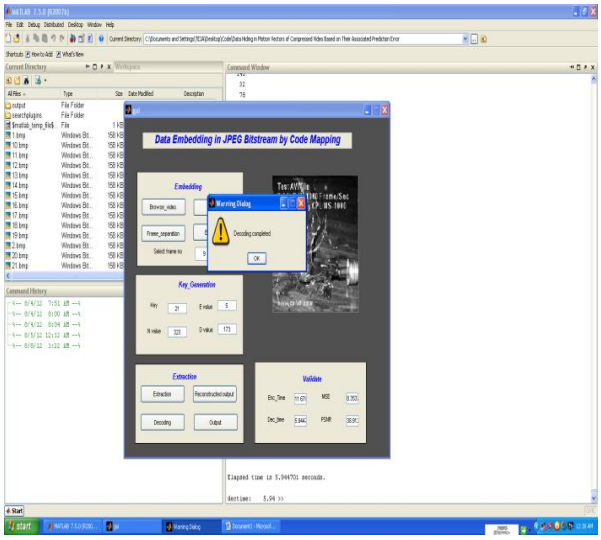
2. Frame separation of browsed video



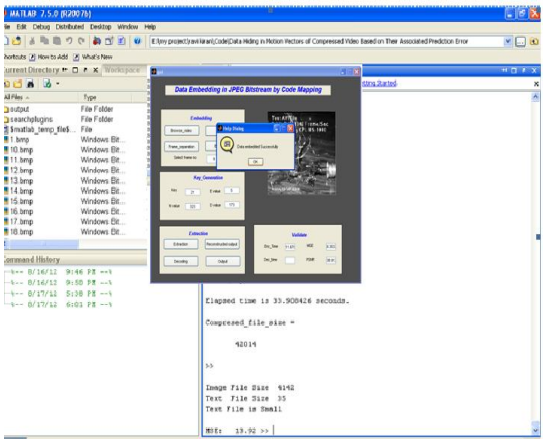
Total frames count= 80

3. Embedding data successfully and encryption time is 18.24 sec

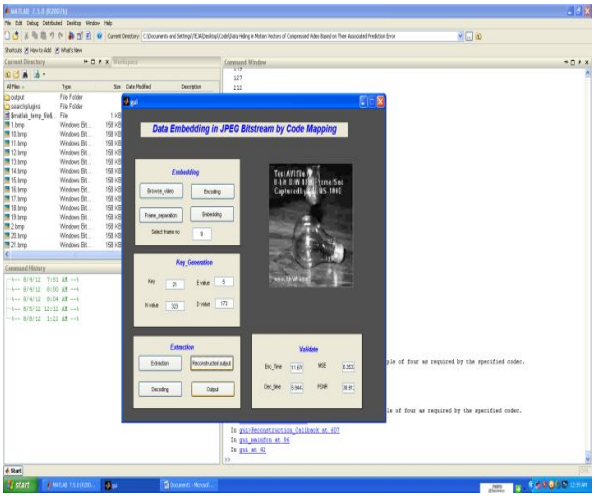
Compressed file size = 42012



4. Decoding time is 11.27 sec and before decoding we have extract the embedded data. And it will save in retrieve.txt file



5. Here is reconstructed output is shown. If we observe clearly the secret msg is exactly embed with that frame.



4. CONCLUSION

In this paper, a data hiding method by simple LSB substitution with an optimal pixel adjustment process is proposed. The image quality of the stego-image can be greatly improved with low extra computational complexity. Extensive experiments show the electiveness of the proposed method. The results obtained also show significant improvement than the existing method with respect to image quality and computational efficiency.

REFERENCES

[1] Ran-Zan Wang, Chi-Fang Lin, Ja-Chen Lin, Hiding data in images by optimal moderately signi7cant-bit replacement, IEE Electron. Lett. 36 (25) (2000) 2069–2070.

[2] A.Z. Tirkel, R.G. Van Schyndel, C.F. Osborne, A digital watermark, Proceedings of ICIP 1994, Austin Convention Center, Austin, Texas, Vol. II, 1994, pp. 86–90.

[3] W. Bender, N. Morimoto, A. Lu, Techniques for data hiding, IBM Syst. J. 35 (3/4) (1996) 313–336.

[4] T.S. Chen, C.C. Chang, M.S. Hwang, A virtual image cryptosystem based upon vector quantization, IEEE Trans. Image Process. 7 (10) (1998) 1485–1488.

[5] L.M. Marvel, C.G. Boncelet, C.T. Retter, Spread spectrum image Steganography, IEEE Trans. Image Process. 8 (8) (1999) 1075–1083.

[6] K.L. Chung, C.H. Shen, L.C. Chang, A novel SVD- and VQ-based image hiding scheme, Pattern Recognition Lett. 22 (9) (2001) 1051–1058.

[7] Chi-Kwong Chan, L.M. Cheng, Improved hiding data in images by optimal moderately signi7cant-bit replacement, IEE Electron. Lett. 37 (16) (2001) 1017–1018.

[8] Ran-Zan Wang, Chi-Fang Lin, Ja-Chen Lin, Image hiding by optimal LSB substitution and genetic algorithm, Pattern Recognition 34 (3) (2001) 671–683.