

High Embedding and Security Techniques for Video Coding By Data Hiding In Motion Vectors

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ABSTRACT

This paper deals with high embedding capacity and quality video. Data hiding in the compression video through motion vectors, i.e embedding data in CMV s in intra frame, with best matching macro block-based search. In this paper we propose new advanced embedding scheme and steganography, data extracted directly. By the intra prediction modes we can embed with more efficiency. The main advantage of proposed method is data hiding video is stegno video and can't understood by any hackers and maintains good perceptual quality of video.

Keywords - Motion Vectors, CMV, Data hiding, Intra prediction, Steganography

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I. INTRODUCTION

For secrete communication copy right protection and authentication for new applications data hiding is required for image and video processing. To avoid illegal activity or reproduce or manipulate them in order to change their owner's identity. Digital water marking and data hiding are the techniques providing best embedding and copy right information in images and videos [1]. The aim of water marking is not to restrict to the original image to access and ensure that embedding data again recoverable [1]. Developers seeking for providing protection on top of data encryption and scrambling for content protection. Developers seeking for protect owner information (water mark) embedded in original image or video. Cryptography converts in to cipher text it cannot understood. A basic model of embedding and steganography shown below

Data hiding techniques has become more important since two decades in various applications. For data hiding so many techniques and algorithms introduced for digital images and videos. Now a day's audio and video and picture frames with hidden copy right symbol helps to avoid un etherized copying directly [2]. hackers may modify the script of particular organization or revel the information to others. A lot of researches have been done in this field and many techniques are introduced but due to

drawbacks in techniques, quality of video like sudden change in frames or noise is disturbing. for all above problems solved by high hiding techniques and steganography. Even though the host data is damaged, this steganography make more complexity to obtain the data.

II.RELATED WORK

VIDEO COPRESSION: Video compression techniques are used to minimize redundancy in video data with unchanged video quality, it mostly used in video conferences and military communication applications and real time applications [3]. For motion-based video compressed process, motion estimation and motion compensation techniques are used for temporal redundancy in frames. We target the motion vectors to encode and reconstruct the video, both the predictive (p)-frame and bidirectional (b)-frames used for getting motion vectors to embed the secrete data by LSB method.

For motion vectors we have two successive methods one is associated macro block prediction error and other is by using magnitude and phase angle in motion vectors and before this the most common method is temporal differencing is used [4].it compares the current frame with previous frame then the current frame is threshold to segment out four ground object but this technique has disadvantages. Due to these reasons authors suggested video coding by motion vectors. Basic idea behind these techniques is all consecutive

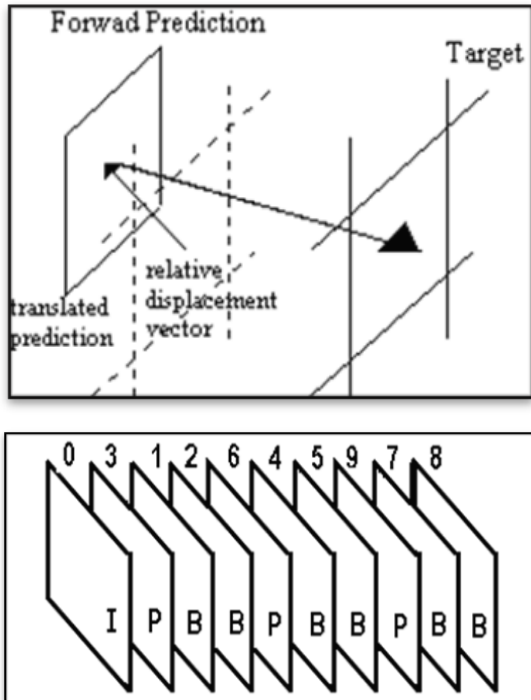
frames is having same similarities both before and after frames

The aim is to reduce this redundancy by block-based motions, for this approach motion estimation is required. The consecutive frame is similar but except some objects moving the within the frames. The most accurate motion is estimated and matched for residual error nearer to zero and coding efficiency will be high. In the motion vectors the predicted frame is subtracted from current frame, the data bits are hidden in some of motion vectors that too in CMVs. These CMVs magnitude is having an above a predefined threshold value.

Embedding: We hide the data in video using phase angle between two consecutive CMVs the data bit code is embedded depend up on phase angle criteria, depends on phase angle sectors [5]. this method used for entire CMVs in all frames, and at data retrieving place also.

The below figure explains each macro block in a predicted frame can be encoded as motion vector.

REFERENCES



III. EXISTING SYSTEM:

Up to now we know data hiding and water marking in digital images and raw videos data hiding in motion vector for compression. The message should

be surviving video lossy compression and without loss extracted. A novel video water mark technique in motion vectors explained with simple diagram mention below.

The above figure explains for video compression basic step is continue video is converted in to number of frames, depends up on mpeg format we have predictive (p)-frame and bidirectional (b)-frame, after conversion of frames with motion estimation process we can reduce temporal redundancy, Motion estimation compares adjacent frames, the displacement of macro block from reference frame to current frame called motion vector [6].by motion compensation an algorithm employed for video compression.

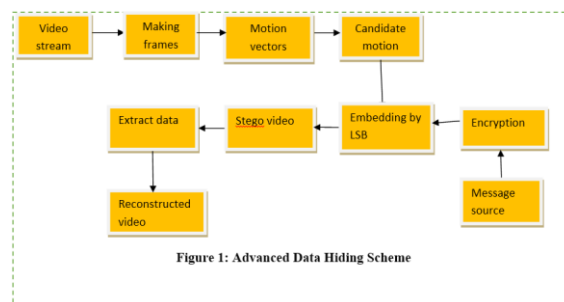


Figure 1: Advanced Data Hiding Scheme

In general, the video format has 'IPBBPBBPI' of frames, we select p-frame and b-frame for embedding. In intra frame we need no remember search area is limited for best match. In general, MBs usually multiple of 4(16x16, 16x8, 8x16, 8x8), And further dividing in to transform blocks, and again sub divide in to predictive blocks; after making fixed transform blocks, block search starts in reference frame with current frame, search is candidate motion vector means encoder find best matched block for encode by vector for motion vector [7], in those motion vectors some of the motion vectors having magnitude greater than threshold value called candidate motion vectors. We find best motion vectors are arranged as set S, which is having magnitude greater the threshold Embedding single bit in phase angle between two successive CMVs. Embedding is done using least significant approach.

$$S = \{MV_0, MV_1 \dots MV_{n-1}\}, |S| = n$$

Where $|MV_i| \geq T, 0 \leq i \leq n$

We can compute phase angle

$$\theta_i = \arctan\left(\frac{MV_{iv}}{MV_{ih}}\right)$$

Where MV_{iv} , MV_{ih} are vertical and horizontal components

continuing for best matching for least prediction error. If matched block is found it is encoded by vector called motion vector.

Candidate motion vectors (CMVs): candidate motion vector means encoder find best matched block for encode by vector for motion vector [7], in those motion vectors some of the motion vectors having magnitude greater than threshold value called candidate motion vectors. We find best motion vectors are arranged as set **S**, which is having magnitude greater the threshold **Embedding** single bit in phase angle between two successive CMVs. Embedding is done using least significant approach.

ALGORITHM:

Step 1: Video is converted in to frames (frame separation).

Step 2: Select P-frame and B-frames for embedding.

Step 3: Performing motion estimation and motion selecting best
 Match block motion

Step 4: Embedding bits in phase angle between two successive CMSs.

Step 5: phase angle above 90degrees

Step 6: Apply secrete key for encryption.

Step 7: Generate stego video.

For encryption steganography is the process to convert message in to cipher text, The advantage of steganography is data keeps in secrecy key is need in encryption process RSA algorithm is best suitable

for data secrecy we get good psnr value after extraction.

ANOTHER ADVANCED METHOD: Because of data size increased at extraction time for video [2]. the new method explains as up to now we are considering p-frame and b-frame for embedding now i-frame is also encoded for using regular method like jpeg, decoder will extracted independently i-frame, p-frame, b-frame. We know video is making like no of group of pictures in each GOP I-frame-frame and P-frame will be there as for mpeg format. The relative information or redundancy is employed by temporal redundancy by using block-based motion estimation, here also single bit hidden in CMVs.in this scheme data bits will increase by block size decreasing, here code efficiency is increasing because micro blocks increased in intra frame, it is increasing the more searching option for best match, it increases best video quality

IV. INTRA PREDITION MODES

Another important data hiding technique is data hiding based on intra prediction modes. For video coding several methods have been proposed in H.264/AVC compressed video standard. Coding efficiency is more compare to previous standards. For this standard the 4x4 spatial Intra predictions provides good quality at decoder.

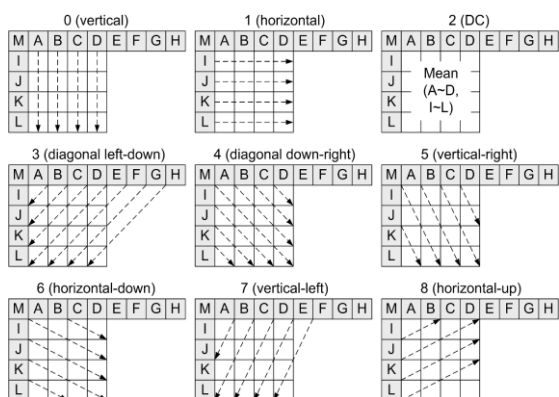
Some work has been done [8]’ on data hiding based on the Intra prediction modes. Author presented data hiding method based on modifying the intra 4x4 prediction modes by mapping between the modes and secret data. For this In the H.264/AVC standard the intra prediction uses in the spatial correlation property. A macro block of interest can be predicted from blocks located above and to the left since they have already been encoded and reconstructed. The subtraction from the current macro block is then coded and represented with a decrease number of bits compared to the one used for the direct processing of the macro block itself. Intra coding has nine modes. Intra 4x4 mode in which each 4x4 luminance macro block can be coded choosing one in nine prediction modes.

This intra prediction mode shows convenient for area of significant details in the picture. one block divide in to sixteen 4x4 macro blocks in that A TO

M are the already encoded samples and other are to be encoded. The modes are decided by formula called rate distortion optimization (RDO).

$$J=d+\lambda mode * R$$

Where R and D are represents bit rate and distortion λ mode represents lagrangian multiplier which represents quantization parameter.



The modes classified an groups listed below

Group 1: Modes 1 and 8.

Group 2: Modes 3 and 7.

Group 3: Modes 2, 4, 5 and 6.

Group 4: Modes 0 and 2.

The embedding process as fallows for group1 the horizontal mode unchanged by embedding 1. same way if we embed 0 to mode 8 it remains same. similar way by modification '00' to mode 4 it becomes 2,'01' to mode4 it is equal to 6.in this way embedding and extraction takes place.

V. Conclusion

We discussed improved methods for data hiding. Depending up on macro block size and best matched motion vectors, we can embed single bit in phase angle between two successive CMVs and also suggested popular steganogrphy method for data secrecy. We can decrease bandwidth of video by small micro block intra frame for best match block. This algorithm can extend in future for different transform domain with embedding techniques for good perceptual quality.

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