

# Analysis of Attacks on Video Watermarking

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**Abstract**—Video is the most popular multimedia on the internet. Now a days copyright protection becomes important traditional video compression algorithm faced two main problems: the first is how to improve the computation speed; the second is how to protect the copyright of the digital products. In recent years there has been significant interests in watermarking. Watermarking is used for the purpose of owner identification, royalty payments, and the authentication by checking whether the data has been altered in any manner from its original form.

**Index Terms**— Embedding, Extracting, Pixel, Watermarking, Edge.

## I. INTRODUCTION

As the computers are more and more integrated via the network, the distribution of digital media is becoming faster, easier, and requiring less effort to make exact copies. One of the major impediments is the lack of effective intellectual property protection of digital media to discourage unauthorized copying and distribution.

Digital video has excellent features for hiding information such as large capacity and good imperceptibility. In video watermarking the challenge is to mark a group of images which are strongly intercorrelated and often manipulated in a compressed form.

## II. PAST WORK

Many research papers from reputed national and international journals are surveyed and few are presented here:

Sang\_Kwang Lee and Yo-sung Ho,[1] propose a new algorithm for digital audio watermarking in the cepstrum domain. In which insert a watermark into the cepstral components of the audio signal using a spread spectrum technique.

Jun Zhang, Maitre. H,Jiegu Li,Ling Zhang,[2] In this paper a blind watermarking algorithm for MPEG2 video is proposed. The algorithm is based on DCT domain, and it embeds the watermark bit into the DCT intermediate frequency coefficients group of the 8×8 blocks.

Lu Jianfeng, Yang Zhenhua ,Chiou-Ting Hsu And Ja-Ling Wu,[3] In this paper, MPEG-based technique for embedding digital “watermarks” into digital video is proposed. In which watermarking technique has been proposed as a method to hide secret information into the signals so as to discourage unauthorized copying or attest the origin of the media.

## III. PRESENT TECHNIQUE

*Discrete Cosine Transform:*

- In this project the methodology which is use is the discrete cosine transform (DCT) algorithm. The discrete cosine transform (DCT) represent an image as an addition of sinusoids of varying magnitudes and frequencies.
- The 2-D discrete cosine transform function computes the two-dimensional discrete cosine transform (DCT) of an image.
- The DCT has the property that, for a typical image, most of the visually important information about the image is concentrated in just small coefficients of the DCT.
- This is the reason that the DCT is frequently used in image compression applications. For ex: the DCT is at the heart of the international standard lossy image compression algorithm known it as JPEG.
- It comes from the working group which developed the standard: the Joint Photographic Experts Group.
- The discrete cosine transforms (DCT) help to divide the image into parts or spectral sub-bands of differing importance with respect to the image's visual feature.
- The DCT is similar to the discrete Fourier transform: it transforms a signal or image from the spatial domain to the frequency domain.
- The equation for a 1D ( $N$  data items) DCT is defined by the following equation:

$$F(u) = \left(\frac{2}{N}\right)^{0.5} \prod_{i=0}^{N-1} A(i) \cos\left[\frac{\pi u}{2N}(2i+1)\right] f(i)$$

## IV. PROCEDURE FOR VIDEO WATERMARKING

a. *Watermark Embedding:*

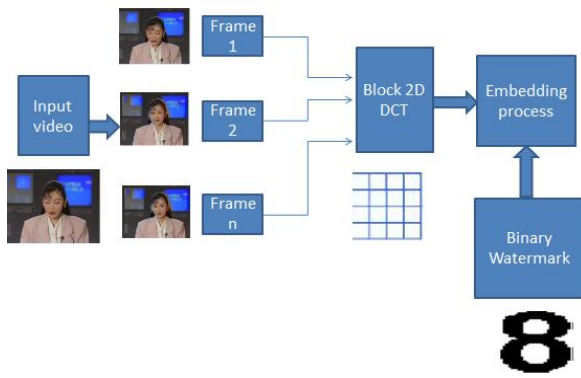


Figure 1: Embedding Process

We embed watermark in the process of video compression. First, the motion vector and prediction error will be computed from the original image sequence.

#### b. Attacking Watermarked Video:

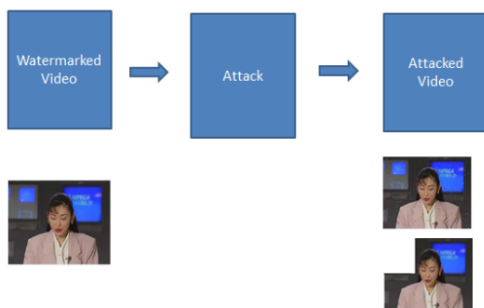


Figure 2: Attacking process

For evaluating the robustness of the proposed Video Watermarking method based on 2D-DCT, various attacks are included into the watermarked video.

For illustrating the robustness of the watermarked video frames to various attacks, we included noise attack, frame dropping and cropping attack.

#### c. Extraction Process:

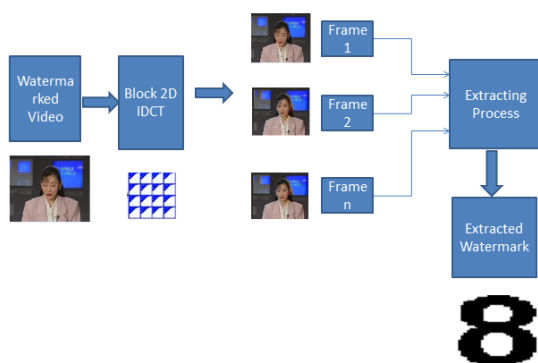


Figure 3: Extraction process

Watermark extraction process is the exact opposite process of the watermark embedding process. The watermark extraction process as follows: Strength of watermark, totally different attacks applied on watermarked video.

The embedded watermark was retrieved using proposed watermarking technique and NC values of recovered watermark are recorded for various attacks eventualities.

NC values for all attacks scenarios are well on top of 0.6 for cropping and mean attack and guarantee the strength of the proposed theme. The Video watermarking technique is powerful against the precise attacks like salt and pepper noise, mathematician noise, median, filtering, rotation, cropping, median filtering.

It absolutely was ascertained that the proposed technique shows more robustness than the sooner DCT based technique. The technique ability to create the watermark resistant to these attacks was analyzed and higher result is inferred.

## V. RESULTS

We have used four different videos to apply watermark and a binary image which is working as a watermark cover. The information about above videos is as follows: First video is vipmen video which is given in matlab files. For watermarking we have used uncompressed videos. We download some videos and then uncompressed them using software.

Sr.no	Name of Video	PSNR	MSE	NC
1	Vipmen.avi	39.9183	1.019	0.9982
2	Vid2.avi	37.8901	1.625	1.0000
3	Vid3.avi	38.4601	1.426	0.9963
4	Composite.avi	37.4497	1.799	0.9967

Table 1: Comparison of different videos

Sr.no	Noise	PSNR	MSE	NC
1	Default	25.20	0.0030	0.9514
2	0.02	24.91	0.0032	0.9158
3	0.05	23.99	0.0040	0.8671
4	0.09	22.33	0.0058	0.8067
5	0.1	21.93	0.0064	0.7946

Table 2: Comparison of different noise intensity attack result

Sr.no	Frame no.	PSNR	MSE	NC
1	1	39.9183	1.0190	0.9982
2	50	39.6945	1.0729	0.9981
3	100	39.6333	1.0881	0.9979
4	150	39.7224	1.0685	0.9988
5	200	39.4397	1.1377	0.9986
6	283	39.7467	1.0601	0.9982

Table 3: Comparison of different video frames

## VI. FUTURE SCOPE

DCT based video watermarking method gives the robust results for watermarking. We can apply different attacks on watermarked video and check the robustness of proposed method with comparing it with other video watermarking methods.

It can be used for more robustness, where watermark can be scrambled into different parts and each part can be embedded into different set of frames using different techniques. So that even if video is attacked then one of the techniques will be able to resist that attack and whole watermark will not be damaged and some part of the watermark can be used for authentication and security.

Here, We used .avi video as a input file, In future we can go with mp4 or HD file. Also we have used matlab 2007b software, In future we can do video watermarking with updated version.

## VII. CONCLUSION

Aim of our project is to study watermarking on multimedia and to verify the effect of various attacks on watermarked video. So until now we have studied the concept of watermark, how it is embedded. We studied different techniques of video watermarking and attacks. The method we are working on is 2D-DCT based video watermarking technique which is blind method.

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