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A SURVEY ON VIDEO COMPRESSION AND VIDEO EMBEDDING METHODS

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***Abstract*— Video compression is more important for the efficient data transfer of the data and to maintain the secrecy of the data that is to be transmitted. The main problem that is faced in the compression is the effective decompression. The input Videos that is compressed may not be more effectively restored in the compression process based on quantization using Discrete Cosine Transformations(DCT) Or Wavelet transformations(DWT). While using transformations the pixel information were lost. To overcome these process encoding process were employed. In the encoding process the pixel information were well preserved but the compression efficiency is not improved. In order to overcome this problem lossless patch wise code formation is employed. In the patch wise code generation the compression process is based on the pixel grouping and removing the relevant and recurrent pixels. In the proposed method the Videos were first reduced in size by combining the current pixel with the previous pixel. The resulting Video size is nearly the half of the size of the input Video. The resulting Video is then divided into small patches. In the patch recurrent pixels and their locations were identified. The identified pixel locations were placed previous to the pixel value and the process is repeated for the complete Video. The result of the each patch acts as the code. In the receiver side the same process is reversed in order to obtain the decompressed Video. The process is completely reversible and hence the process can be employed in the transmission of the Videos. The performance of the process is measured in terms of the compression ratio and the Video quality analysis of the input and the decompressed Video based on PSNR, MSE and SSIM.**

***Keywords*— Patchwise code formation(PCF)algorithm, Least Significant Bit (LSB), Discrete Wavelet Transform (DWT), Discrete Cosine Transform (DCT).**

I. INTRODUCTION

The aim of video compression is to decrease inconsequentiality and redundancy of the video data provide capable solutions to store or transmit data in an efficient form.Video compression can be categorized as two ways such as lossy or lossless. Lossless compression is chosen for archival purposes and frequently for medical imaging, technical drawings, clip art, or comics. Lossy compression methods are widely used, characterized by the quality of the reconstructed images and its adequacy for application.Lossy methods are especially suitable for natural videos such as imperceptible) loss of reliability is acceptable to achieve a substantial reduction in bit rate. The lossy compression that produces hardly noticeable differences may be called visually lossless. One of the reason that intruders can be successful is that most of the information they acquire from a system is in a form that they can read and figure out. Hackers may reveal the information to others, modify it to pretend an individual or organization, or use it to launch an attack. One solution to this problem is to use steganography. Steganography is a technique of hiding information in digital media.

This paper is organized as follows. Section II illustrates the Literature review. Section III provides a detailed overview on the proposed technique. Section IV describes the methodology of proposed work. Section V represents the algorithm for methodology and the paper is concluded in section VI.

II. LITERATURE REVIEW

In this section, we are presenting the research work of some prominent authors in the same field and explaining a short description of various techniques used for video compression as well as embedding.

1.In the year 2015,Saif Alzahir and Arber Borici[1] has proposed their work as an innovative method for lossless compression of discrete-color Videos, such as map Videos, graphics, GIS, as well as binary Videos. This method comprises two main components. The first is a fixed-size codebook encompassing 8×8 bit blocks of two-tone data along with their corresponding Huffman codes and their relative probabilities of occurrence. The probabilities were obtained from a very large set of discrete color Videos which are also used for arithmetic coding. The second component is the row-column reduction coding, which will encode those blocks that are not in the codebook.

ADVANTAGES:

- Low complexity

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- Easy to implement

DISADVANTAGES:

- This works best on mid-to-small size videos not well suited for large size Videos

2.Shivani Khosl and Paramjeet Kaur[2] presented their paper provides a review and analysis of the different existing methods of steganography and digital watermarking along with some common standards and guidelines drawn from the literature.

ADVANTAGES:

- Almost all digital file formats can be used for steganography, but the formats that are more suitable are those with a high degree of redundancy.

DISADVANTAGES:

- The output Video by hidden data is not visually recognizable.

3.Sonali S.Ekhande, Prof. S.P.Sonavane andDr. P .J .Kulkarni[3] described their propsed work as a universal approach for steganalysis for detecting presence of hidden messages embedded within digital Videos. This paper describes wavelet like decomposition to build higher order statistical model of natural Videos.

ADVANTAGES:

- Feature selection strategy implemented here gives relevant features to be used for training and thus reduces the training complexity.

DISADVANTAGES:

- It does not directly obtain the feature importance

4. N. Askari, H.M. Heys, and C.R. Moloney[4] has proposed a method for processing halftone Videos that improves the quality of the share Videos and the recovered secret Video in an extended visual cryptography scheme for which the size of the share Videos and the recovered Video is the same as for the original halftone secret video.

ADVANTAGES:

- A processed Video contains white and black blocks and can be used as an input secret Video in any visual cryptography encoding process.

DISADVANTAGES:

- As the new scheme does not change the share generation approach

5. Usha B.A, N K Srinath, N K Cauvery[5] has explained their work as one of the ways to detect the hidden message is to view the statistical properties of the video or medium in which the message is hidden

ADVANTAGES:

- The methods used in status quo are sufficiently advanced and can provide suitable defence against current attacks.

DISADVANTAGES:

- The generalised $\chi 2$ attack does not calculate an estimation of the message length and can be sometimes wrong if the message has a significant difference in the number of zeros compared to ones.

6.RaviKumar.B and Murti. P.R.K[6] authors proposed their work deals with implementing security using Steganography. In this technology, the end user identifies an Video which is going to act as the carrier of data.

ADVANTAGES:

- The patchwork approach is used independent of the host Video and proves to be quite robust as the hidden message can survive conversion between lossy and lossless compression.

DISADVANTAGES:

- If the Video already contains some data you cannot add some more data for the same Video.

7.GurpreetKaur and Kamaljeet Kaur[7] have proposed a Fingerprinting, cryptography and Digital signature techniques are compared with watermarking. We need water-marking for digital data security .It provides ownership assertion, authentication and integrity verification, usage control and content labelling.

ADVANTAGES:

- A grille cipher employs a template that is used to cover the carrier message.

DISADVANTAGES:

- It is not visible or perceivable, but it can be detected by different means.

8.Sandeep Katta[8] presented his work as a recursive hiding scheme for 3 out of 5 secret sharing. The idea used is to hide smaller secrets in the shares of a larger secret without an expansion in the size of the latter.

ADVANTAGES:

- The idea used is to hide smaller secrets in the shares of a larger secret without an expansion in the size of the latter.

DISADVANTAGES:

- The general threshold recursive schemes are not visual cryptography schemes.

9. G. J. Garateguy, G. R. Arce and D. L. Lau[9] proposed their work as a advantage of the optimality properties of CVTs and through a modified version of Lloyd's algorithm, achieves optimization of the stacked binary patterns that build the mask.

ADVANTAGES:

- After this point there is no advantage of using the Voronoi tessellation, a few Gaussian based filters are sufficient to determine the rank values of the dots up to a certain rank.

DISADVANTAGES:

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- The clustering process that is implemented both in light and dark tones, does not rely on kernels but relies on Voronoi regions

10.Teena M. Thomas[10] has published their research work is tested by applying various attacks. stationary wavelet transform (SWT) is used in combination with principal component analysis (PCA) in order to increase the robustness against many attacks, to increase the amount of payload and also the processing speed.

ADVANTAGES:

- Important advantage of the SWT is the watermark need not to be strictly square in dimensions which is a mandatory condition in many transformation techniques like DCT, DWT etc.

DISADVANTAGES:

- The DWT is not a time-invariant transform. This means that, even with periodic signal extension.

11.Kundankumar Rameshwar Saraf, Vishal Prakash Jagtap, and Amit Kumar Mishra[11] has explaine their proposed scheme as a Encryption of text and Video based on AES is developed. The basic steps of AES is applied to the Videos considering Videos as a matrix.

ADVANTAGES:

- The proposed method has the advantage of being suitable for mobile devices, which currently use the JPEG Video compression algorithm, due to its lower computational requirements.

DISADVANTAGES:

- An attacker can break the password in seconds by using the list of pre computed hashes .

Most of the research works are doing level wise embedding and compression. These types of compression and embedding have some artifacts problem such as time and computational complexity.In order to overcome these process,we have to follow our proposed work.

III. PROPOSED WORK

In the proposed work , we have to embed the consecutive video frames. First we have do preprocessing step. In preprocessing step, we have to remove the noises. Noise is nothing but some unwanted things that contaminates the Video. Before we start the embedding process we will go for compression. For doing compression here we are using block wise pixel grouping. In this process, Video is split into patches. In each patch recurrent pixels and their locations were identified. The identified pixel locations were placed previous to the pixel value and the process is repeated for the complete Video. The result of the each patch acts as the code. After compress all frames we will go for embedding process. Here we are applying LSB method for video embedding.

IV. METHODOLOGY

In this proposed work, we have to analyse six types of methodology can be used for video compression and embedding. They are

- Preprocessing
- Compression using patch code formation
- Embedding using LSB
- LSB Extraction
- Decompression
- Analysis Parameters

A. Preprocessing:

In preprocessing step, we are doing the noise removal process using Fuzzy Adaptive Median Filter(FAMF). Noise is nothing but some undesired information that contaminates a Video. Here,we are applied Gaussian filter to remove the noises. So that the proposed method is effortless but efficient and works instead in two phases they are detection of noisy pixels followed by median filtering of the corrupted pixels to overcome many of the shortcomings observed in the existing methods. Detection operation is carried out at all locations but filtering is performed only at selected locations.

B. Compression Using Patch Code Formation:

The main problem that is faced in the compression is the effective decompression. The input Videos that is compressed may not be more effectively restored in the compression process based on quantization using Cosine Transformations or Wavelet transformations. While using transformations the pixel information were lost. To overcome these processes encoding process were employed. In the encoding process the pixel information were well preserved but the compression efficiency is not improved. In order to overcome this problem lossless patch wise code formation is employed. In the patch wise code generation the compression process is based on the pixel grouping and removing the relevant and recurrent pixels. In the proposed method the Videos were first reduced in size by combining the current pixel with the previous pixel. The resulting Video size is nearly the half of the size of the input Video. The resulting Video is then divided into small patches. In the patch recurrent pixels and their locations were identified. The identified pixel locations were placed previous to the pixel value and the process is repeated for the complete Video. The result of the each patch acts as the code.

C. Embedding Using LSB:

After getting the compressed frames we will go for embedding .Here we are using LSB method for embedding.The Least Significant Bit (LSB) is one of the main techniques in spatial domain Video Steganography.The LSB is the lowest significant bit in the byte value of the Video

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pixel. The LSB based Video steganography embeds the secret in the least significant bits of pixel values of the cover Video(CVR).In order to use the simple concept of LSB Embedding. Mostly in Video formats the level of precision is extremely greater than regarding the average vision in human.Hence, an changed Video with light variations is identical in its colors from the unique by a human being. In conventional LSB technique, which requires eight bytes of pixels to store 1byte of secret data but in proposed LSB technique, just four bytes of pixels are sufficient to hold one message byte. Rest of the bits in the pixels remains the same.

D. LSB Extraction:

Reverse order of the same process is done for LSB extraction from the receiver side for getting the information.

E. Decompression:

Reverse process of the compression process are done for getting decompressed output.

F. Analysis of Parameters

Our Proposed work can be compare with existing embedding approaches for the parameters of

- PSNR
- MSE

V. ALGORITHM FOR VIDEO COMPRESSION AND EMBEDDING

First of all, input the video will be converted into the frames then each frame will be preprocessed using Fuzzy Adaptive Median Filter (FAMF) for removing the noise.Then each frames are separated and also compressed using patch code formation. Once all the frames are compressed then the suggested framework is used for two consecutive frames are embedding using Least Significant Bit(LSB). Finally,the LSB technique is used for embedding the compressed frames. And also reverse order of the compressed frame process is getting for the decompressed the frames into videos.These steps are involved using methodology of our proposed work as follows:

STEP 1: Input the video
STEP 2: Convert the Frames
STEP 3: Pre-processing using FAMF
STEP 4: Separated into each frames.
STEP5: Compression using patch code formation
STEP 6: Frames are compressed
STEP 7: Two frames are embedded using LSB.
STEP 8: Decompressed the frames to videos

VI. CONCLUSION

In this paper, based on our proposed work has introduced a method of patch based code formation for using from this compression based embedding can achieve more accuracy and reduce time complexity and provide security. Here we can use compression mainly for reduce the number of bits and also embedding process for maintain the security process. Hence, the result of our proposed work is based on simple and fast compression as well as embedding that does not degrade the video quality and security.

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