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Secret Data Hiding Using Inter frames for Copyright Protection

Ch.Navya sai prasanna kumar [1], Dr.Fairooz [2]

1. Post Graduate scholor, Malla Reddy Engineering College, Kompally, Ranga Reddy, Telangana.
2. Associate Professor, Department of Electronics and Communication Engineering, Malla Reddy Engineering College, Hyderabad-500100, India

Abstract— ***Data is the new form of resource today. Data is created and available everywhere today which can be perfectly copied and rapidly transited at large scale today. This data creation and transmission is playing vital role in functioning of various institutions but the major challenge here is protection and security for the data. Content owners are raising concerns that, traditional data protection mechanisms such as encryption, is no longer reliable. In this paper, we present a secret data hiding mechanisms through watermarking technology. A Watermark is a recognizable image or pattern in pattern that appears as various shades of lightness/darkness when viewed by transmitted light (or when viewed by reflected light), caused by thickness and density variations in the paper. The purpose of watermarks is to protect content and to claim ownership of an asset. Without watermarks, valuable digital assets can be susceptible to content theft or unauthorizeduse. The working model is developed and tested periodically..***

Keywords— Watermark, Discrete wavelet Transformation (DWT), Singular Value Decomposition(SVD),2D Barcode,Steganography

I. Introduction

More and more digital multimedia data are available today, which can be perfectly copied and rapidlydisseminated at large scale. Watermarking technology is used to provide data security to this digital data. A watermark is a recognizable image or pattern in paper that appears as various shaded by thickness or density variations in the paper. Watermarks vary greatly in their visibility, while some are obvious on casual inspection others require some study to pick out. Various aids have been developed, such as watermark fluid that wets the paper without damaging it.

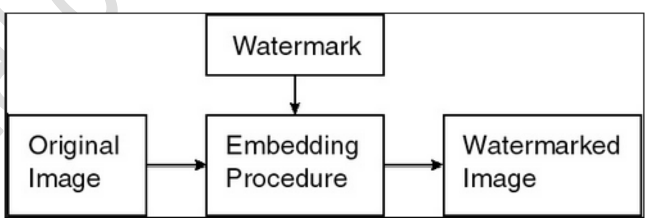

Fig.1.1Block Diagram

Fig.2.2 Symbols of Watermarks

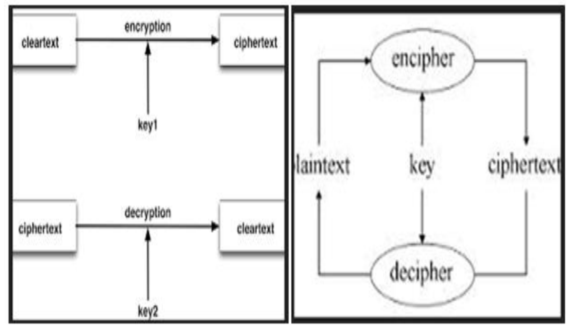

Fig. 1.3 Cryptography Process

II. PAGE LAYOUT

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.An easy way to

Types of watermark

1. Division based on human perception
2. Division based on applications
3. Division based on level of information required
4. Based on user's authorization to detect the watermark
5. Division based on knowledge of the user on the presence of the watermark

The watermarking uses discrete wavelet transformation(DWT) and singular value decomposition technologies. The combination of Discrete Wavelet Transformation (DWT) and Singular Value Decomposition (SVD) of Blue channel is used to embed the watermark. With separable filters, applying a 1-D transform to all the rows of the input and then repeating on all of the columns can compute the 2-D transform.

III. SIGNIFICANCE OF WORK

Unless you're giving prints or files to someone who has paid for them in some way, you should always use watermarks on all your publicly displayed electronic images. Most people are probably innocently unaware; they see an image they like, rights click it.

IV. APPLICATIONS OF WATERMARKING:

A. ID card security

Information in a passport or ID, Can also be included in the person's photo that appears on the ID. By extracting the embedded information and comparing it to the written text, the ID card can be verified.

B. Medical application

Names of the patients can be printed on the X-ray reports and MRI scans using techniques of visible watermarking. The medical reports play a very important role in the treatment offered to the patient. If there is a mix up in the reports of two patients this could lead to a disaster.Watermarks are often used as security features of banknotes,passports ,postage stamps and other documents to prevent counterfeiting. Watermarking proposes an effective, robust and imperceptible video watermarking scheme. The combination of Discrete Wavelet Transformation (DWT) and Singular Value Decomposition (SVD) of Blue channel is used to embed the watermark. The wavelet transform has gained widespread acceptance in signal processing in general and in image compression research in particular.Withseparable filters, applying a 1-D transform to all the rows of the input and then repeating on all of the columns can compute the 2-D transform.

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, then next step is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support.The drawbacks of SVD-based image watermarking are false positive, robust and transparency. The former can be overcome by embedding the principal components of the watermark into the host image, the latter is dependent on how much the quantity (i.e., scaling factor) of the principal components is embedded. The experimental results demonstrate that the performance of the proposed methods outperforms than those of the existing methods. Now a day's digital multimedia data exchange through internet is main idea which requires protection to enhance security. The 2D barcode with a digital watermark is a widely interest research in security.The Project presents an effective, robust and imperceptible video invisible watermarking scheme. This scheme embeds the watermark into any of frame from video. Here the blue channel of frame will be selected for watermarking based on Discrete Wavelet transformation and Singular Value Decomposition.Digital watermarking can be defined as embedding information into digital signals. Original signal is distorted as a result of watermarking. The goal in reversible watermarking is to reconstruct the original signal from the watermarked signal without error.

V. CRYPTOGRAPHY

Cryptography is the practice and study of techniques for secure communication in the presence of third parties. More generally, it is about constructing and analyzing protocols that overcome the influence ofadversaries and which are related to various aspects in information security such as data confidentiality, data integrity, authentication and non-repudiation. Cryptography prior to the modern age was effectively synonymous with encryption, the conversion of information from a readable state to apparent nonsense.

VI. STEGANOGRAPHY

Steganography is the art or practice of concealing a message, image, or file within another message , image, or file. The word steganography combines the Ancient Greek words stegano meaning "covered,concealed,or, protected",and graphing meaning, "writing".

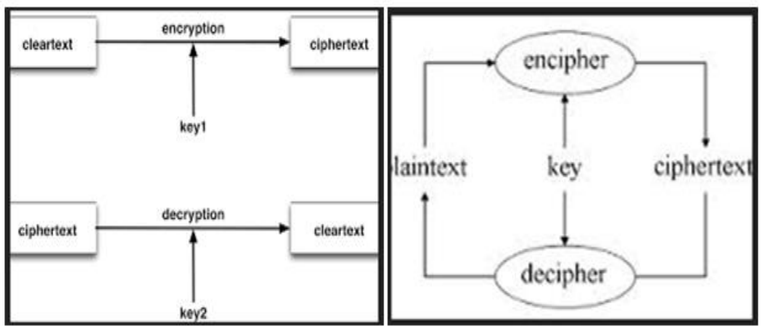

Fig.3.4 Cryptography Process

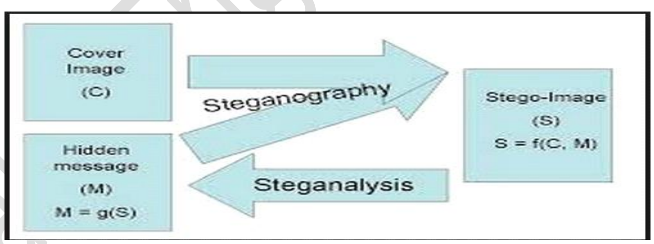

Fig.4.5 Steganography Process

VII. WATERMARK EMBEDDING

The human eyes are more sensitive to noise in lower frequency range than its higher frequency counterpart, while the energy of most natural images are concentrated on the lower frequency range.

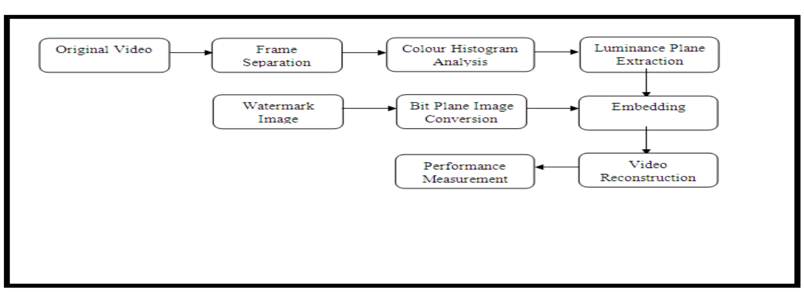

Fig.5.6 Watermark Embedding Process

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VIII. WATERMARK EXTRACTION

The extraction of watermark requires the original frame, the watermarked frame and also the digital watermark. First of all, both the original frame and the watermarked frame are DCT transformed.

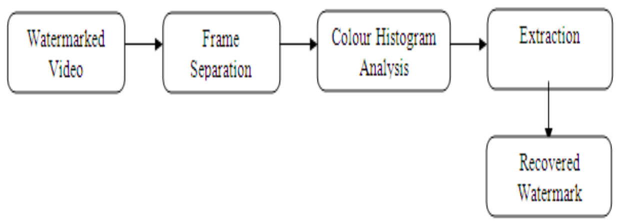

Fig.6.7 Watermark Extraction process

Extracting Process

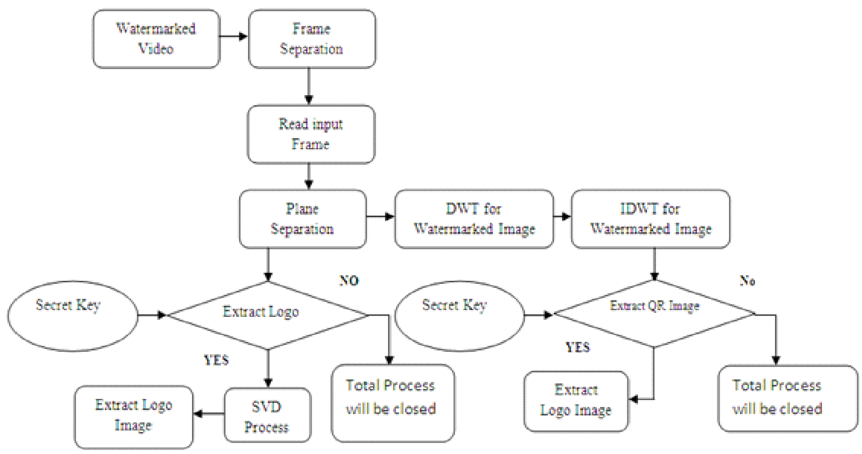

Fig.7.8 Flow Chart for Extraction Process

VIDEO

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.

Advantages

Ease of manipulation

Editing is easier and faster with a digital video.

Preservation of data

It is not true that DV is better simply because it is digital. Big screen films are not digital and are still highly esteemed as quality images. However, it is easier to maintain the quality of a digital video.

MPEG

Stands for Moving Picture Experts Group. It used to name the set of digital video compression standards and file formats developed by this group.

AVI

Stands for Audio Video Interlaced. It is one of the oldest formats. It was
Created by Microsoft to go with Windows 3.1 and it's "Video for Windows" application.

MOV

It is able to store both video and sound. Simultaneously, the format was once superior to AVI.

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.

Coding for Frame Separation

```
file=aviinfo('movie1.avi');
frm_cnt=file.NumFrames
str2='.bmp'
h = waitbar(0,'Please wait...');
for i=1:frm_cnt
frm(i)=aviread(filename,i);
frm_name=frame2im(frm(i));
frm_name=rgb2gray(frm_name);
filename1=strcat(strcat(num2str(i)),str2);
imwrite(frm_name,filename1);
waitbar(i/frm_cnt,h)
end
close (h)
```

COLOUR FRAME [Color Image (RGB type) – Three Planes]

An image can be defined as a two-dimensional signal (analog or digital), that contains intensity (gray scale), or color information arranged along an x and y spatial axis. Also it is defined as collection of pixels. An image is a visual representation of something. In information technology, the term has several usages: An image is a picture that has been created or copied and stored in electronic form.

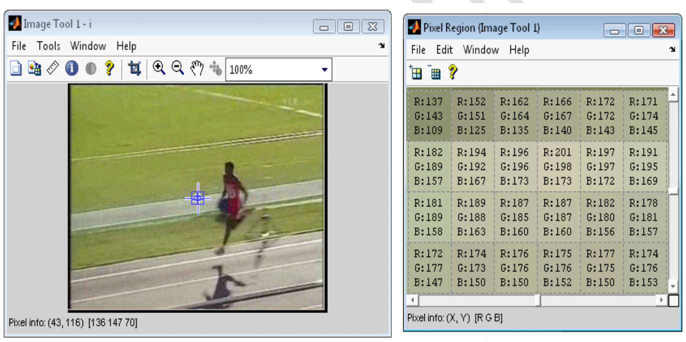

Fig.8.9Color Image with Intensity Planes

An image is a visual representation of something. In information technology, the term has several usages: An image is a picture that has been created or copied and stored in electronic form.

CONVERT INTO GRAY SCALE FRAME[Single plane – Intensity range[0-255]]

Each pixel is a shade of gray, normally from 0 (black) to 255 (white). This range means that each pixel can be represented by eight bits, or exactly one byte.

```
i=imread('frame_no.bmp');
imtool(i);
k=rgb2gray(i);
imtool(k);
```

A grayscale Image is digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray (0-255), varying from black(0) at the weakest intensity to white(255) at the strongest.

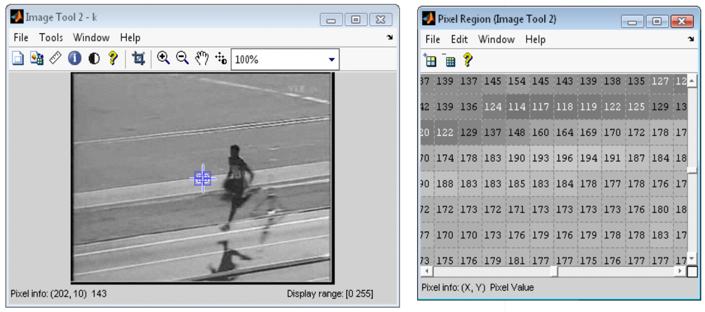

Fig.9.10Gray Scale Image with Intensity Planes

The basis set of wavelets is generated from the mother or basic wavelet is defined as: a,b(t) = ; a, b and a>0. The variable ‘a’ (inverse of frequency) reflects the scale (width) of a particular basis function such that its large value gives low frequencies and small value gives high frequencies. The variable ‘b’ specifies its translation along x-axis in time. The term 1/ is used for normalization. The Two-Dimensional DWT (2D-DWT) converts images from spatial domain to frequency domain.

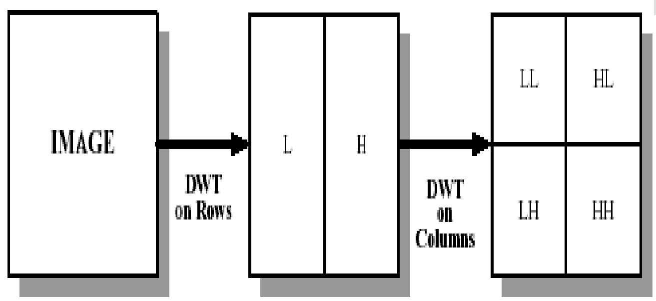

Fig.10.11Block Diagram of DWT (a) Original Image (b) Output image after the 1-D applied on Row input (c) Output image after the second 1-D applied on row input

The Two-Dimensional DWT (2D-DWT) converts images from spatial domain to frequency domain.

IX. EXPERIMENTAL RESULTS

On watermarking scheme, a set of gray-level images of 512*512 pixels ,”Lena” ,shown in figure 1, was used as host images .A binary image “JNTU LOGO” , each with 32*32 bits, was used as watermark in the simulations and is shown in the figure2.

Fig. 2 DWT for Lena image (a) Original Image (b) Output image after the 1-D applied on column input (c) Output image after the second 1-D applied on row input

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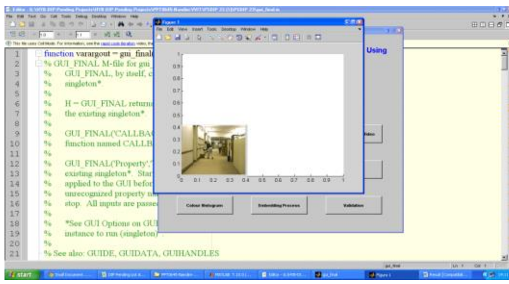
512x512 Lena (Host Image)

Watermark Logo

512x512 Watermarked Lena

BASE PAPER METHOD (Bit Plane Slicing)



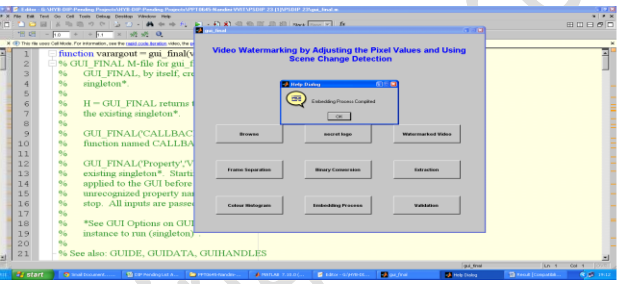


Fig.2.1 Input Video Fig. 2.2 Watermark Embedding

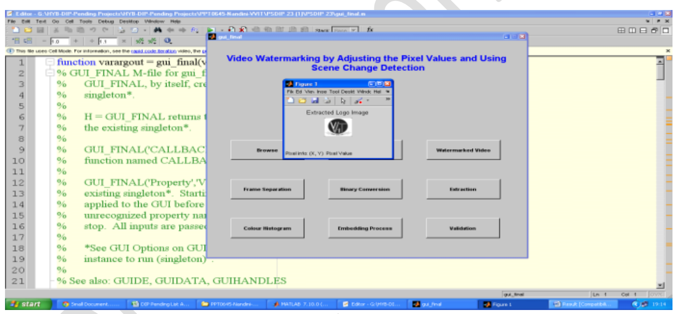


Fig. 2.3 Extracted Logo from Watermarked Video

MODIFICATION RESULTS (DWT-SVD Process)

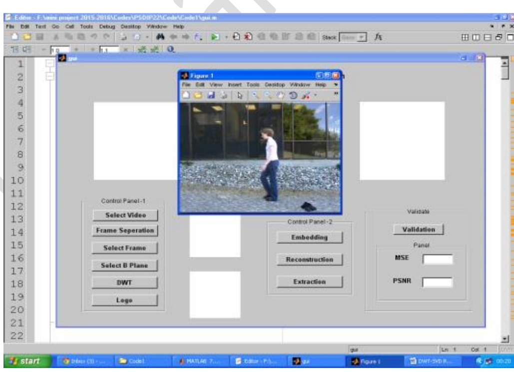


Fig. 2.4 Input Video

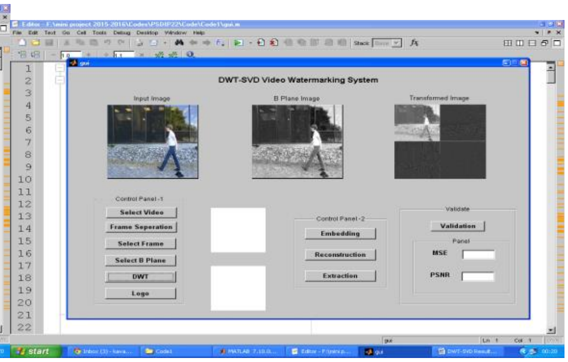


Fig. 2.5 DWT

Fig. 2.6 Result Analyses

X. FUTURE SCOPE

The watermark embedding scheme can be extended to include encrypted watermarks. Watermark extraction algorithm can be extended to perform watermark validation automatically. Suitable feature extraction and matching techniques have to be explored.The noise removal scheme has been implemented for stationary images. This can be extended to noise removal in case of non-stationary images for dynamic denoising.

XI. CONCLUSION

The Project presented an effective, robust and imperceptible video watermarking concealment. Here, discrete wavelet transform was used to reserve space for concealing data effectively and chaos encryption was used as to protect image contents. Watermark recognition is used to recognize the input water mark for verification to access the video. This system was generated the Watermark image with less error under maximum data hiding capacity. Finally, the performance of system was evaluated with quality metrics such as error and PSNR factor. It is widely used for copy right protection of image or videos during internet sharing. It was better compatible approach and flexibility with better efficiency rather than prior methods.

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