DIGITAL IMAGE WATERMARKING - PROJECT REPORT

[1]R. Hema, [2]Mrs.S.Shobana

[1]M. SC Computer Science, [2]Head & Assistant Professor
Sri GVG Visalakshi College for Women, Udumalpet

***Abstract*: The possibility of adding several watermarks to the same image would enable many interesting applications such as multimedia document tracing, data usage monitoring, and multiple property management. A watermarked image** 100 **that has been geometrically distorted, either intentionally or unintentionally. Before the method begins, a global synchronization described in watermarking literature is used to compute an estimate of the affine geometric distortion of the image since being embedded with the digital watermark. To extract a watermark message from the block, a watermark reader first needs to determine the geometric distortion and compensate for it.**

***Keywords*: Watermarking, Morphological Filters, Color Enhancement, Resolution Hiding, Security Providing**

1. INTRODUCTION:

Digital watermarking systems typically have two primary components: an encoder that embeds the watermark in a host media signal.

The reading component analyzes a suspect signal to detect whether a watermark is present.

1.1 WATERMARKING :

Watermarking is the process of embedding watermark into a multimedia object can be detected or extracted later to make an assertion about the multimedia object.

1.1.1PROCESS OF WATERMARKING

The image watermarking process is based embedding and extraction. The watermark used for embedding logo image, which is small compared with the size of the original image. The watermark is embedded to the original image to get the watermarked image.

1.2 TYPES OF WATERMARKING

1.2.1 VISIBLE WATERMARK

The watermark appears, information is visible to a viewer in video or documents only on careful inspection. The logo displayed in one corner of different television channels is an example of visible watermarking, permitting all image detail to be visible through the watermark, and making the watermark difficult to remove.

1.2.2 INVISIBLE WATERMARK

The invisible watermark is completely imperceptible and the advantage of such type of watermarking includes high perceptual quality and a large number of application areas.

1.3 WATERMARKING APPLICATIONS:

1.3.1 COPYRIGHT PROTECTION

Copyright protection objective is to embed information about the source and thus typically the copyright owner of the data in order to prevent other parties for claiming the copyright on the data.

1.3.2 FINGERPRINTING

An impression on a surface is formed by the ridges on a fingertip, especially such an impression made in ink and used for identification.

1.3.3 AUTHENTICATION

Modifying a digital document is becoming easier while detecting that the content is modified becomes harder.

1.4 WATERMARKING REQUIREMENTS:

An image watermarking process needs to satisfy the following requirements.

IMPERCEPTIBILITY

Imperceptibility is defined as the amount of distortion which is injected by embedding the watermark.

SECURITY

Watermarks should survive deliberate attempts to remove them. Ideally, a watermark should remain readable up to the point where the content becomes modified enough to be of low value.

ROBUSTNESS

The watermarked object is published and distributed, it is subjected to common operations such as conversion, compression, addition, editing, and removing which may influence on watermark extraction process.

CAPACITY

Image watermarking capacity is an evaluation of how much information can be hidden within a digital image. The hidden bit rate in digital object is defined as capacity or payload and usually is measured in bit per second (bps).

2. PROBLEM STATEMENT

The problem associated with watermarking technique is that it can provide a tracking mechanism for identifying the origin of biometric data. Watermarking involves embedding the information into the host data. A watermarked image is likely to be subjected to certain manipulations, some intentional such as compression, cropping and filtering etc. They are listed below:

Lossy Compression: Many compression schemes like JPEG and MPEG can potentially degrade the data quality through irretrievable loss of data.

Collusion: A number of authorized recipients of the image should not be able to come together (collude) and like the differently watermarked copies to generate an unwater marked copy of the image

Forgery: A number of authorized recipients of the image should not be able to collude to form a copy of watermarked image with the valid embedded watermark.

3. METHODOLOGY

3.1MORPHOLOGICAL BAND PASS FILTERING

Step 1. Perform the morphological erosion and expansion operations, respectively. It is larger

$$F01 = f \circ B_1 = (f \ o \ B_1) \oplus B_1,$$

Step 2. The morphological opening operation is employed to get the image, from the binaried test image is smaller in size.

$$F02 = f \circ B2 = (f \ oB2) \oplus B2,$$

Step 3. The results of morphology band-pass filtering is obtained via image differential operations.

$$f\,03 = f\,02 - f\,01.$$

Step 4. The operation destroys the original border and shape of the feature resulting in algorithm failure.

Step 5 To avoid distortion caused by opening operations using large structuring elements.The morphological algorithm is introduced to improve morphological band-pass filtering

$$F \text{ marker } 1 = f \quad B1.$$

Fmarker1 and *f* marker 2 is carried out, respectively.The iterative formula is

$$I0 = f \text{ marker } 1$$

$$In+1 = (In \oplus T) \wedge f$$

$$I'0 = f \text{ marker } 2$$

$$I'n+1 = (I'n \oplus T) \Lambda f$$

where the operator, Λ, implies that the two images take the minimum value, 3 × 3 rectangular structuring element.

The termination condition is

$$fr1 = In+1 = In$$

$$fr2 = I'n+1 = I'n$$

That is, when the expansion result of In or I'n is unchanged.

$$F \text{ marker } 2 = f \quad B2.$$

In marker 2,foreground areas of a smaller size than the feature are also corroded to an empty set. However, features and other foreground areas with a larger size still have some pixel residue. Then, under the constraint of the morphological reconstruction of *f*

$$I0 = f \text{ marker } 1$$

$$In+1 = (In \oplus T) \Lambda f$$

$$I'0 = f \text{ marker } 2$$

$$I'n+1 = (I'n \oplus T) \Lambda f$$

where the operator, Λ, implies that the two images take the larger the structuring element, the more significant the distortion.The band-pass filtering result *f*0is obtained by the difference operation of *fr*2 and *fr*1

$$f0 = fr2 - fr1$$

Step 6 Finally, By the properties of dilation and erosion operations meet the requirements of the improved algorithm for large structural elements.

3.2 COLOR CORRECTION

1.Estimate the noise standard deviation σ in the input image I.

2.Calculate the curvelet transform of the input image. We get a set of sub-bands w_j, each band w_j contains N_j coefficients $C_{j,k}$ ($k \in [1, N_j]$) and corresponds to a given resolution level.

3.Calculate the noise standard deviation σ_j for each band j of the curvelet transform.

4.For each band w_j, calculate the maximum value M_j of the band and multiply each curvelet coefficient $C_{j,k}$ by Velde function $y_c(C_{j,k}, \sigma_j)$ which is a non-linear function enhancing the faint edges.

5. Reconstruct the enhanced image from the modified curvelet coefficients.

4.Conclusion

The Color Correction method could be modified to apply the watermark to blocks of pixels throughout the image, rather than the whole thing. Due to this change, the method would begin to resemble that of the Morphological method, generally considered to be an improvement upon the Color Correction method.

Watermarking methods can be created that are more resilient and contain the best combination of tamper-proof techniques.This method is also ideal for private images where tampering is not an issue because personalized images can be used as watermarks, as opposed to the pseudo-random identifiers relied on by the Color Correction method. It could be a learning tool for anyone interested in watermarking methods.

Future Work

Every application has its own merits and demerits. Further enhancements can be made to the application, so that the web site functions very attractive and useful manner than the present one.

References

[1] Shruthy V C, Saira Varghese "An Efficient Self-Embedding Watermarking Scheme for Colour Image Tamper Detection and Recovery" International Journal of Computer Science and Mobile Computing" Vol. 4, Issue. 1, January 2015.

[2] Mohan Durvey, Devshri Satyarthi " A Review Paper on Digital Watermarking" International Journal of Emerging Trends & Technology in Computer Science Volume 3, Issue 4, July-August 2014 ISSN 2278-6856

[3] Hemani , Samridhi Singh "A Survey of Digital Watermarking Techniques and Performance Evaluation Metrics" International Journal of Engineering Trends and Technology Volume 46 Number2 -April 2017

[4] Heng Zhang, Chengyou Wang and Xiao Zhou " Fragile Watermarking for Image Authentication Using the Characteristic of SVD" 17 February 2017

[5] Anamika Joshi , Rashmi Tiwari " Digital Watermarking : The reliable protection to multimedia content" International Journal of Advanced Research in computer science" Vol 2 No 3 June 2011

[6] Prerna Parmar, Neeru Jindal " Image Security with Integrated Watermarking and Encryption " Journal of Electronics and Communication Engineering . Volume 9, Issue 3, Ver. V (May - Jun. 2014).

[7] Hamid Sadeq Mahdi **"**Protecting Digital Images by Wavelet Based Watermarking Method in Network Environment" International Journal of Computer Science and Mobile Computing Vol. 4, Issue. 5, May 2015.

[8] Kiran, Kanwar Garg "Digital Watermarking: Potential Challenges and Issues" International Journal of Computer Science Engineering and Technology | March 2015 | Vol 5, Issue 3.

[9] Samreet Kaur, Ravneet Kaur Sidhu "Secured Digital Image Watermarking by using a Hybrid Technique with Kalman Filtering" International Journal of Computer Science and Information Technologies, Vol. 7 (2) , 2016.