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Improving Image Steganography Using Invisible Watermarking Technique

[1]Kiran Kakade, [2]Manisha Kumari, [3]Mahesh Wakade, [4]Minakshi Wangekar, [5]Mrs. Lakshmi Madhuri

[1, 2,3,4,5] Dr.D.Y.Patil School of Engineering, Pune, India

Abstract: **Image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Digital image processing is a type of image processing where the images are manipulated by electric means. Steganography is the art or practice of concealing a file, message, image, or video within another file, message, image, or video. Invisible watermark intended to be imperceptible to the human eye or inaudible. This watermark can only be determined through watermark extraction or detection by computers. The proposed method is invisible watermarking for color and grey scale images, which embed two, secrete images in one color image. This method is intended for use in image security application as well as in copyrights of images.**

Keywords: **Invisible watermarking, DRM, Encryption, Digital watermarking, robustness, watermark stamping.**

I. INTRODUCTION

This paper represents a system to protect an image from copyrights. It focuses on security and quality of an image. One of the most important properties of digital information is that it can be replicated and distributed easily. It mostly happens in industries like film, music, book, software. In such a case it is important to protect the identity of owner and it is also important to secure it from alteration. Steganography and watermarking bring a variety of very important techniques how to hide important information in an undetectable and/or irremovable way in digital media like audio, video and digital images. These two are the main techniques which are widely used in digital communication to protect and secure the digital contents. While encryption is also used to improve the security parameters like privacy and confidentiality but the same process is not much used to provide copyright protection, simply because any user who has a decryption key may decrypt digital images as he or she wishes. This indicates the necessity of embedding information on the rightful owner into an image in such a way that the information and the image cannot be easily separated. To achieve this goal, a new method was invented known as digital watermarking. The most important requirement of digital watermarking is that embedded watermarks are robust against compression, filtering, cropping, geometric transformation and other attacks.

II. LITERATURE SURVEY

Image quality can be estimated in terms of the existing Full-Reference quality metrics, such as PSNR. Thus, at the receiver side of a communication system, without the original image, the quality of a distorted image can still be assessed [1]. The experimental results on IWT and DWT methods have relatively high PSNR values. IWT techniques are better in terms of image quality of the secret image as reconstruction of the images is better in IWT than in DWT [2].There are so many techniques of Steganography like image, network, video, audio, text etc. which can be used for various purposes according to the available material. There are so many image Steganography techniques like spatial domain techniques, transfer domain techniques, distortion techniques, masking and filtering [3]. The Hash-LSB with RSA algorithm technique provides more security to data as well as data hiding method [5].Image encryption can also be done with a new method which employs magnitude and phase manipulation using Differential Evolution (DE) approach. The novelty of this work lies in deploying the concept of keyed discrete Fourier transform (DFT) followed by DE operations for

encryption purpose [6].There is a new image encryption scheme which employs one of the three dynamic chaotic systems (Lorenz or Chen or LU chaotic system selected based on 16-byte key) to shuffle the position of the image pixels (pixel position permutation) and uses another one of the same three chaotic maps to confuse the relationship between the cipher image and the plain-image (pixel value diffusion), thereby significantly increasing the resistance to attacks [7]. Introduce a block-based transformation algorithm based on the combination of image transformation and a well known encryption and decryption algorithm called Blowfish. The original image was divided into blocks, which we rearranged into a transformed image using a transformation algorithm presented here, and then the transformed image was encrypted using the Blowfish algorithm [8].This paper aims at improving the level of security and secrecy provided by the digital color signal-based image encryption provides more security. The image encryption and decryption algorithm is designed and implemented to provide confidentiality and security in transmission of the image based data as well as in storage [9]. To improve the security one more important image encryption technique is in picture based on the rotation of the faces of a Magic Cube. The original image is divided into six sub-images and these sub-images are divided amongst a number of blocks and attached to the faces of a Magic Cube. The faces are then scrambled using rotation of the Magic Cube. Then the rotated image is fed to the AES algorithm which is applied to the pixels of the image to encrypt the scrambled image. Finally, experimental results and security analysis show that the proposed image encryption scheme not only encrypts the picture to achieve perfect hiding, but the algorithm can also withstand exhaustive, statistical and differential attacks [10].

III. SYSTEM ARCHITECTURE

This work proposes a novel scheme for encrypted watermarking of images. It consists of following steps:

3.1 Image pre-processing:

In image pre-processing the secrete images which are to be hide in one color image are first encrypted using Blowfish Algorithm. To provide more security it uses a key (key1) while encrypting the images.

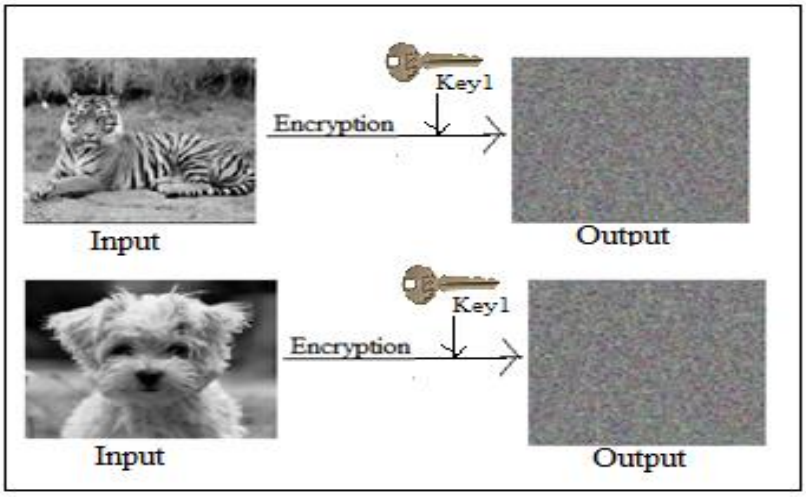

Fig.1: Image pre-processing

3.2. Embedding pre-processed images:

Here the encrypted images are embedded in color cover image using SVD (Singular value decomposition) Algorithm. To increase the security we again use different key for embedding (key2).

Algorithm:

Image Embedding

Input: SecreteImageOne,SecreteImageTwo,CoverImage

Output: Embbeded/Stego Image

1) Input SecreteImageOne

Bitmap imgOne = new Bitmap(SecreteImageOne);

2) Resize Image

Bitmap R_imgOne = Resize(imgOne,512,512);

3) Encrypt image

Bitmap E_imgOne = Encrypt(R_imgOne);

4) Input SecreteImageTwo

Bitmap imgTwo = new Bitmap(SecreteImageTwo);

5) Resize Image

Bitmap R_imgTwo = Resize(imgTwo,512,512);

6) Encrypt image

Bitmap E_imgTwo = Encrypt(R_imgTwo);

7) Input CoverImage

Bitmap C_img = new Bitmap(CoverImage);

Bitmap StegoImg = c_img.Embbed(E_imgOne,EimgTwo,SecreteKey);

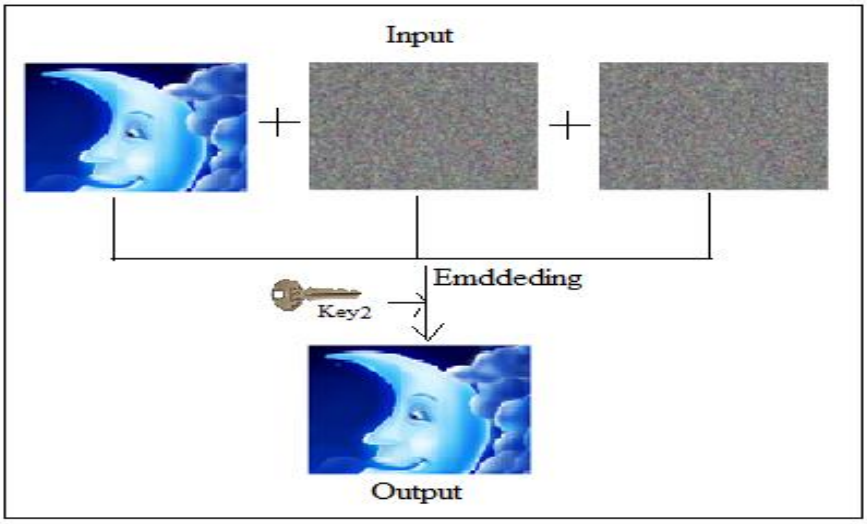

Fig.2: Embedding

3.3 Extraction:

Here the embedded images are extracted using reverse algorithm of SVD (Singular value decomposition).

Algorithm:

Image Extraction

Input: Embbeded/Stego Image

Output: SecreteImageOne,SecreteImageTwo,CoverImage

1) Input Embbeded/Stego Image

Bitmap Stego_img = new Bitmap(StegoImg);

2) Perform Extracton

[EimgOne,EimgTwo,C_img] = Stego_img.Extract(SecreteKey);

3) Perform decryption on both extracted images

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Bitmap imgOne = EimgOne.Decrypt();
Bitmap imgTwo = EimgTwo.Decrypt();
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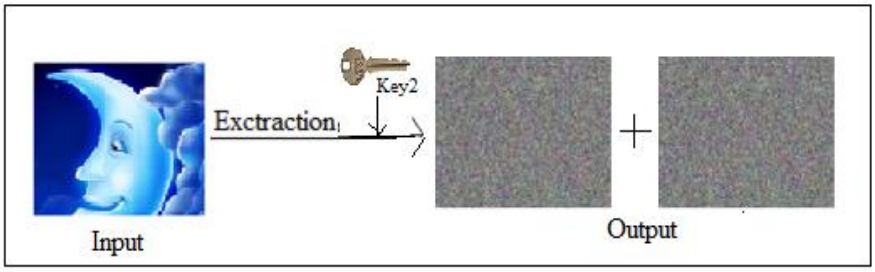

Fig.3: Extraction

3.4 Decryption:

Here the encrypted images are decrypted using reverse Blowfish algorithm.

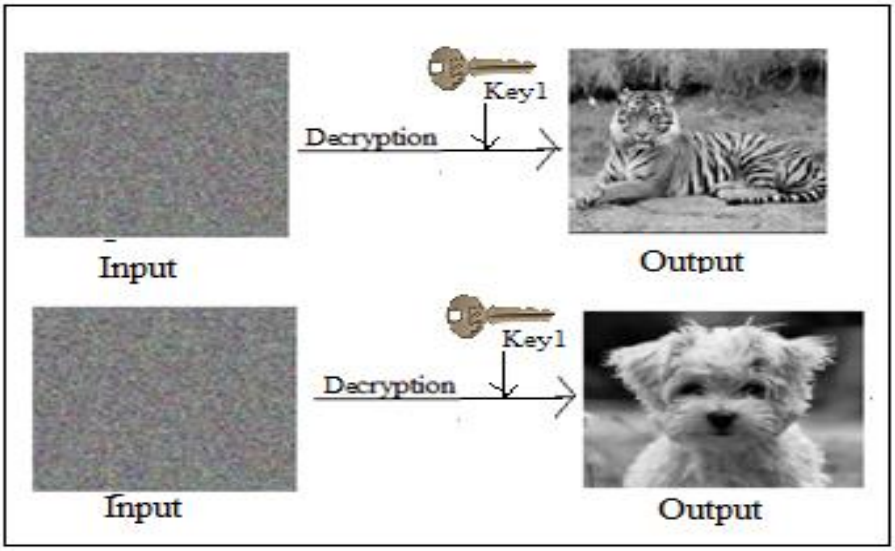

Fig4: Decryption

3.5 Proposed System Architecture:

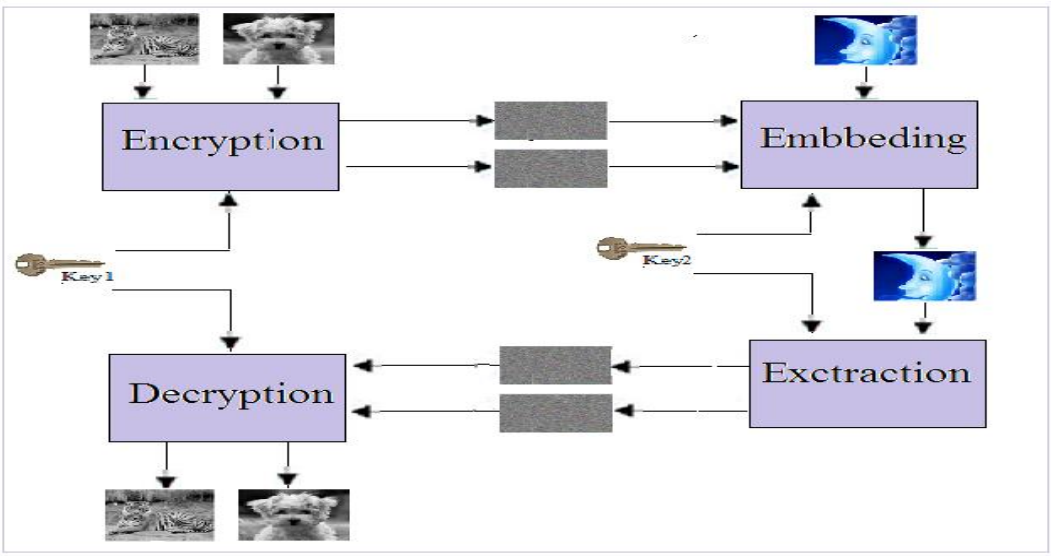

Fig 5: System Architecture

IV. CONCLUSION

A new efficient scheme for image security is introduced in this paper, which allows encrypting two secrete images and embedding in one color image. It also encrypts keys to provide more security to the images. As two images are hidden in one image, more amounts of data can be protecting in less space. Confidentiality is maintained at high rate. This concept can also be used to secure another type of data like text, video.

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