



A Review on Visual Cryptography Techniques

Er. Varinder Saini
CSE (Computer Science and Engineering)
SBBSU (Sant Baba Bhag Singh University)
Jalandhar, India
gurinderritz@gmail.com

Er. Rajandeep Kaur
AP CSE (Computer Science and Engineering)
SBBSU (Sant Baba Bhag Singh University)
Jalandhar, India
gill.rajandeep@gmail.com

Abstract-- Visual Cryptography is one of the reliable technique for the security purpose. In this technique we divide the image into shares and then these shares are encrypted using encryption algorithms. Visual Cryptography is done on black and white image as well as on color image. This paper includes the literature survey regarding Visual Cryptography techniques.

Keywords: Cryptography, Data Encryption Standard (DES), Keyed Visual Cryptographic Scheme (KVCS), Discrete Cosine Transform (DCT), Singular Value Decomposition (SVD).

I. INTRODUCTION

In recent days network security has become an main issue. Encryption has come up as a solution, and plays an important role in network security system. Many methods are needed to guard the shared data. Because of the growing demand for information security, image encryption decryption has become an significant research area and it has broad application prospects.

1.1 Cryptography

Cryptography is a way through which information can be made invisible to the users by encrypting them. It is the study and implementation of techniques to hide information, or simply to protect a message or text from being read.

1.2 Visual Cryptography

Visual cryptography is a powerful encryption technique to hide information in images in such a way that it can be decrypted by the human vision if the correct key image is used. Visual Cryptography Schemes (VCS) is a technique of image encryption novel to hide the secret information in images. Visual cryptography technique was introduced by Naor and Shamir in 1994 as an alternative for conventional cryptography. It uses two or more transient images (called shares). One picture contains arbitrary pixels and the other picture contains the secret information that is hidden. It is not possible to recover the secret information from any one of the pictures (images). Either transparent images or layers are required to reveal the secret information. The simple method to implement visual cryptography is to print the two layers onto a transparent sheet. When the random image contains truly random pixels it can be seen as one-time pad system and will offer unbreakable encryption. In the overlay animation it can be observed by sliding the two layers over

each other until they are correctly aligned and the hidden information appears. In visual cryptography, the bit of message consists of a collection of white and black pixels i.e. it is assumed to be a binary image and each pixel is handled separately. Each original pixel appears in n modified versions (called shares) of the image, one for each transparency. Each share contains m black and white sub pixels. Each share of the sub pixels is printed on the transparency in close proximity. [24]

II. LITERATURE REVIEW

B. Er. RimsyDua et al (2016) In this paper they have effectively implemented the proposed methodology using DES (Data Encryption Standard) algorithm. This concept is enhanced by the transformation of meaningless to meaningful shares and the security is enhanced by using DES algorithm with the help of which shares of secret image are encrypted. The tool that they have used for the implementation of proposed scheme is MATLAB. [1]

Vinita Malik et al (2016) In this paper they propose a new algorithm for colored visual cryptography and making it more safe with the help of Digital Enveloping technique by applying it on the shares of the image. Digital Enveloping is method in which shares of the image to be sent are distributed over a variety of sample images to generate the enveloped images. At the receiver end, shares are retrieved from the enveloped images and combined to form original image without corrupting the quality of image. Decryption procedure of visual cryptography is based on OR operation, so if any person get all the shares; then the image can be easily decrypted by him. They introduced ARGB Algorithm for secret sharing of colored images along with the enveloping scheme that was previously proposed in which ARGB shares are enveloped within the covers of images using LSB replacement. Hence, this technique increases the security of visual cryptography technique from the attack of hacker as he is not able to retrieve the images without having all the 4 enveloped images. [2]

Ch. Rupaet al (2016) In this paper they proposed a new proposal that is Keyed Visual Cryptographic Scheme (KVCS) to reduce the attack by hacker. KVCS is used to raise the computation factors which provide more security to data of image. In KVCS, every input share of original image is encrypted with a shared key share using mathematical operators. At the end, the original image which should be shared secretly would be encoded into two shares and sent

through the network to the receiver. A person outside this sharing would not be able generate original image even by stacking the encrypted images.[6]

Miss. Kashmira S. Gulhaneet al (2016) In this paper the image is divided into parts known as shares and then these shares are distributed to the participants. In Decryption phase stacking the share images gets the original image. For the RGB/CMY Images different methods are developed which are based on the color decomposition techniques. The Decryption process is very easy generated shares are printed on transparencies. Transparencies are overlapped on top of the other gets the secret image. The displacement of pixels and rearranging of the image in steps between the processes has proven to be valuable. The extra transposition of RGB values in the image file after RGB component reshape has proven to increase the security of the image against all probable attacks available currently.[10]

Kalyan Daset al (2016) In this paper they have applied Sliding Puzzle Technique on the images and showed good result without any alteration. The algorithm proposed by this scheme reduces the time for encryption and decryption of images in a much easier way and it ensures the lossless transmission of images. Encryption is carried out on the basis of RGB values of pixels. Hybrid approach to visual cryptography where they take colored images and split the image into multiple rows and columns, resulting image tiles. For decryption, they have (row*col)! Combinations out of which only one gives back the original image. For this purpose symmetric key is used.[4]

NidhalKhdhair El Abbadiet al (2016) In this paper they suggested a new method of image encryption based on three major steps: the first step aims to scrambling the image values with Fibonacci transform. The second step aims on generating public and private key based on Diffie-Hellman key exchange, these keys used to encrypt the diagonal matrix which are formed by (SVD) Singular Value Decomposition .In third step, decryption is the contrary to encryption. The results were assured and the decrypted image is retrieved without any loss in its information.[8]

K.Kanagalakshmet al (2016) In this paper they proposed a method that is based on Blowfish algorithm with superior features. It has been enhanced with the help of a supplementary key approach to strengthen the security of image or any sensitive data which are communicated by electronic means. The proposed algorithm is developed and tested with different sets of data. The performance of the proposed methods is considered in terms of time, space complexity and security also. The results are recorded and a better performance is observed.[7]

Gaurav Kumar et al (2016) In this paper they have purposed a new technique known as digital watermarking as the simple visual cryptography is not so secure for sharing of data and it also does not ensure the user authentication. In this cryptographic technique secret images are divided into n shares and a certain number of shares (m) are sent over the network. This project presents an approach in which visual cryptographically generated image shares are embedded in the host images to provide authentication for the VC shares and makes these secret shares invisible by embedding them into host images. The shares are embedded into the host image in Frequency Domain using Discrete Cosine Transform (DCT).The weakness of binary secret shares is overcome by hiding them invisibly into the host images. In

decryption phase, the secret shares are extracted from their cover images without need of any cover image characteristics because the watermark extraction scheme is blind. The overlapping of these shares reveals the original secret image. The decoded secret image quality is enhanced.[3]

AshaBhadran R(2015) Inthis paper presents a visual cryptography technique for color images in which the generated shares are again encrypted. For this XOR operation is used and this will provide double security for the secret document. Secret shares are not available in their actual form for any modification by the adversaries who try to create fake shares. The proposed method uses the concept of half toning. When the color image is given as input, decoded image was color halftone image. [11]

M.Karolinet al (2015) In this paper they proposed a method for images with 256 colors which are converted to 16 standard RGB colors format. It generates shares without compromise the resolution. The Floyd – Steinberg dithering algorithm is used to manipulate the 256 color code image to decrease it to 16 standard colors code image. The proposed method employs (2, 2) XOR-Based visual cryptography method is used to generate shares. Decryption procedure enables secret image sharing and stacking. The proposed method converts the 256 color image to 16 color code format for the share formation, the intensity of the original image is maintained. [12]

Manika Sharmaet al (2013) Inthis paper they proposed a cryptographic technique for color images where we are using color error diffusion with XOR operation. To add more security to the secret sharing of the image Invisible Digital Watermarking is used which protects the secret image from the hacker. Random number procedure is used to generate the shares.In decryption process use RSA algorithm. This approach produce a reduced amount of unclear image and the size of the decrypted image is equivalent as the original image. [20]

Sozan Abdulla(2010) presents a system which takes four pictures as an input and generates three images which are in contact with three of the four input images. During the process of decoding, they just select a small number of subset from all of the three images, in order to make the transparencies of them. They stacked them in Last In First Out manner. In this method, after splitting the original image to a number of shares and applying the recoloring procedure. According to the color combination groups they predict the adversary may find out some useful information such as the shape or pattern of the original secret image. Reconstructed image which is obtained is of same size as that of original secret image.[23]

III. CONCLUSION AND FUTURE SCOPE

In order to protect confidential data, we need some security measures. Visual Cryptography provides an effective and efficient way for providing security to a digital image. Using Visual Cryptography, the quality of an image can also be improved. This review paper contains information regarding the techniques that are used to provide security to a digital image. The future scope of the work is to use 3D Images instead of 2D for creating shares and also improve the contrast of decoded secret image.

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