

# Literature Review on a Natural Image Based VSS Scheme for Sharing Secret Image

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**Abstract:** *Conventional visual secret sharing scheme hide secret images in shares they are either printed or in digital form. Meaningful images or noise like pixels are appear due to hiding secret image in shares, but during the transmission of share it will increase interception risk. Hence visual secret sharing scheme suffer from transmission risk problem. To solve this problem author proposed a natural image based visual secret sharing scheme. In that secret images are transferred through various media to secure the secret and participant also. The proposed natural image based visual secret sharing scheme can transmit one digital image or printed image and noise like share over n-1 natural shares. The natural images may be in printed or in digital form. Natural image is a combination of printed and digital image. Natural image and printed image generate one noise like share. The unaltered natural shares are different, thus reducing the transmission risk problem.*

**Keywords:** visual secret sharing scheme, natural image based visual secret sharing scheme, conventional vss scheme, natural images, transmission risk.

## 1. Introduction

Visual cryptography is a method that hides a secret image into n number of shares. Conventional visual secret sharing schemes use a unity of media as a carrier such as transparencies or digital media. The proposed natural image based visual secret sharing scheme use diverse media for hiding secret image and reduces the transmission risk problem. Conventional visual secret sharing scheme increases the transmission risk problem. Hence we propose natural image based visual secret sharing scheme.

Natural image based visual secret sharing scheme considers only one secret image and n - number of natural images. Natural image based visual secret sharing scheme takes a gray or color natural shares or even web images, hand-printed images.

Conventional visual secret sharing schemes generate the noise-like shares and after that divide the noise like shares and transmit at the receiver side. Conventional visual secret sharing scheme suffers a management problem. It also suffers from a pixel expansion problem, in pixel expansion the size of recovered image is different as compare to original image. Hence extended visual cryptography scheme is proposed to overcome the management problem. Extended visual cryptography scheme adds cover image on each share so that it is easy to maintain for both sender and receiver. It is easy to know that in which cover which image is hidden.

Threshold visual cryptography scheme converts image into binary form. Threshold visual cryptography scheme was first announced by Naor and Shamir. A secret image is encrypted into n- number of shares then printed on transparencies, shares are generated with the help of n- number of natural images and one secret image and then spread among n-number of participants.

Secret communication becomes popular among people. Visual secret sharing scheme hide the secret image in n-

number of shares and spread among n-number of participants. A visual secret sharing technique based on random grid visual secret sharing algorithm this method is announced by kafri and keren in 1987. In this method generated shared images are meaningless, so user cannot manage huge amount of data properly. Random grid visual secret sharing scheme is proposed to overcome the problem of pixel expansion.

Visual cryptography is a secret sharing. In this secret image is encoded into n-number of shares in random binary pattern and distributed among n-number of participant.

This paper is organized as follows: Various Schemes and Literature survey are discussed in section II. In section III proposed scheme is discussed, comparative analysis of different schemes is conducted in section IV and section V gives the conclusion.

## 2. Related Work

Kai-Hui Lee and Pei-Ling Chiu[1] proposed Conventional visual secret sharing scheme hides the secret image in shares, but at the time of hiding secret image in share it will arouse suspicion to hacker that there is some hidden image in shares. It will increase a transmission risk problem. Natural image based visual secret sharing scheme is proposed to overcome the transmission risk problem. Natural image based visual secret sharing scheme reduces the transmission risk problem. In natural image based visual secret sharing scheme encryption and decryption algorithm is used. In the encryption process printed image and digital image is given as input along with the secret image .printed image is first proceed in a step called image preparation step in which we manually crop the image so that there is no irrelevant feature in the image. After that printed and digital image features are extracted in step called feature extraction in this we convert an image pixel value into binary form. After that balance the number o's and 1's in an image and then add the noise in an image, then do pixel swapping in the next step in which XOR operation is performed between

secret image and feature extracted. In next step encryption operation is performed using secret image and digital image and output of the previous step.

Kai-Hui Lee and Pei-Ling Chiu[2] proposed Extended visual cryptography scheme consider n-number of natural image and one secret image. Extended visual cryptography scheme generate a noise like shares with every share associate a cover image and in that cover image hides a secret image. The algorithm which has been proposed in this method is easy to maintain for both sender and receiver because they know that in which cover image is hidden. It is easy for receiver also to combine cover image and extract secret image. In this paper they propose general approach to clarify the pixel expansion problems, this approach only for binary secret images. There are two phases in this proposed approach. First phase based on a given access structure, in this phase using an optimization technique they construct meaningless shares. In second phase using stamping algorithm they add cover image in each shares. The experimental result display that problem of pixel expansion is solved by extended visual cryptography scheme for general access structure.

Pei-Ling Chiu and Kai-Hui Lee[3] proposed that a threshold visual cryptography scheme considers more than one secret image and n-number of natural images. Threshold visual cryptography scheme considers only binary image. The algorithm which has been proposed in this method consider more than one secret image and n-number of natural image so that computation cost is increased and performance is degraded, but in this case performance is higher and it also maintain the contrast of an image. In this paper an optimization technique is proposed based on pixel expansion free threshold visual cryptography scheme in order to encipher binary unseen images. They recognize blackness as an efficient metric in the assessment of the display quality of an output image. To maximize the contrast of an output image they first solve the problem as a mathematical optimization. Then they establish a simulated annealing based algorithm to clear up this problem.

Tzung-Her Chen and Kai-Hsiang Tsao[4] proposed that a visual secret sharing technique based on random grid visual secret sharing algorithm this method is announced by Kafri and Keren in 1987. In this secret image and natural image pixel is divided into two grades grade1 and grade2 depending on which pixel is move on which grade. And at the receiving end grade1 and grade2 is combined, then move the pixel in grade1 and grade2 depending on which pixel belong to which grade. In this paper they propose random grid visual secret sharing, does not introduce any pixel expansion. To achieve two meaningless random grids G1 and G2, the first random grid G1 is achieved by selecting the color white or black. Then, given a certain private pixel and the grid pixel of G1 and grid pixel of G2 is resolved. G1 and G2 stacked results are always fully black although the private is black and white or black with  $\frac{1}{2}$  probabilities although the private is white. In this way the private is recognizable through stacked random grid.

I. Kang, G.R. Arce and H.K. Lee[5] proposed that a visual cryptography encryption method which create meaningful

shares because of encoding a secret image in shares. Color visual cryptography encryption method is simple. Color visual cryptography depends on two principle first one is error diffusion and second one is pixel synchronization. Error diffusion is efficient algorithm for image halftone generation and synchronization is used to improve the contrast of shares. The error filter is planned in such a way that the low frequency dissimilarity between the output and input image is maximized and it creates halftone images for human vision. Synchronizing the visual information pixels beyond the color channels make better visual contrast of shares. Due to random permutation colors of encrypted pixels and contrast can be disgraced in color visual cryptography scheme. To construct color extended visual cryptography with VIP synchronization and error diffusion for visual quality improvement for this, paper develop an encryption method. Before and after encryption VIP synchronization contain the original VIP values and shares with high visual quality produce by error diffusion.

Z. Zhou, G. R. Arce, and G. D. Crescenzo[6] This paper focal point on establishing a common halftone visual cryptography (HVS) framework, where a private binary image is hidden into a big quality halftone share. In particular the suggested process applies the affluent idea of blue noise halftone to the development mechanism used in conventional visual cryptography to create halftone shares. Although the secret ownership is still protected. The likewise contrast is achieved by the total decoded image. The halftone shares move important visible data to the observer like photography, scenery, painting, construction vice versa. The visible character obtains through recent plan is better as compare to the extended visual cryptography. In this paper halftone visual cryptography technique is proposed to obtain visual cryptography through halftone. This method is based on the void and cluster algorithm to encrypt a binary private image into n halftone shares bear significant visual information. Visually attractive halftone shares carrying important visual data which is generated by the proposed method. Visual quality which is obtained is better than other available visual cryptography method.

### **3. Proposed Scheme**

Natural image based visual secret sharing scheme [1] is having a three process. The [1] feature extraction algorithm consist of three steps a) Binarization b) Stabilization c) chaos. In binarization process image is converted into 0's and 1's. Stabilization is used for searching black and white pixel from image. In last chaos introduce noise. In encryption algorithm with the help of secret image and feature extracted from natural image combine to form noise like share and at last generate the quick response code. QR code is used to store amount of data.

### **4. Comparative Analysis**

There are various schemes which are proposed for hiding secret image. But in this paper extended visual cryptography scheme divide the noise like share and add one cover image with each share so it is suspicion to hacker that there is some secret image in the cover image [2]. It tampers the security [2]. Extended visual cryptography scheme send noise like

image in shares, that time if receiver cannot get the share properly so, it is difficult for receiver to obtain secret image [2]. In this paper cover images are added with each share so it tampers the security [2].

Different type of images are used for hiding secret image [3]. In this paper stimulated annealing algorithm used only binary secret image [3]. It cannot maintain the contrast of gray and color image [3]. Stimulated annealing algorithm is not working properly on brightness [3].

In this paper [4] at the receiving end receiver cannot get the image properly because when they move pixel in grade 1 and grade 2 that time image pixel value is mismatch. It also affects the brightness of original image [4].

In this paper [5] due to color inconsistency low visibility of shares are produce and due to matrix random permutation color of encrypted pixel and contrast is degraded.

It causes the appearance of some content information in reconstructed secret image, such as shape of the earth [6]. It destroys the quality of secret image [6]. It also affects the quality of shares [6].

## 5. Conclusion

The paper propose visual secret sharing scheme Natural image based visual secret sharing scheme hide secret image over n-1 arbitrary selected natural shares. Therefore they are totally secure. Therefore visual secret sharing scheme reduce the transmission risk problem and provide security for secret image. With the help encryption algorithm extended visual cryptography scheme for general access structure reduces the pixel expansion problem. The major contribution of our work is, it reduces the pixel expansion problem. Major contributions are this is the first attempt to send secret image through various carrier media and for image sharing hand printed image is successfully introduced and third one is to generate quick response code to store noise shares.

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