HALF TONE VISUAL CRYPTOGRAPHY

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ABSTRACT: *Visual cryptography could be a variety of cryptography that permits the visual info to be encrypted in such some way that their decoding may be performed by human sensory system. It encodes a secret binary image into shares of different binary patterns.When the shares are xeroxed onto transparencies, the secret image can be visually decoded by superimposing a set of transparencies. But the shares of the decoded image haven't any that means. Extended visual cryptography was proposed to construct meaningful binary images as shares, but the visual quality is poor. In this , a technique named halftone visual cryptography is implemented to achieve visual cryptography via half toning. This technique utilizes the void and cluster formula to code a secret binary image into halftone shares (images) carrying vital visual info. The simulation shows that the visual quality of the obtained halftone shares is unnoticeably higher than that earned by any on the market visual cryptography technique.*

***Keywords*- Halftone,GrayScale,VC.**

1. INTRODUCTION

Visual cryptography (VC), made-up by Noar and Shamir , is a method for protecting image-based secrets that has a computation-free decoding process. In the VC scheme, the input image is transformed into noise-like shares to ensure that the contained secret is unreadable. These shares may be written on clear slides and distributed to the participants. Any set of or a lot of shares will decode the key within the original image, but no information about the secret can be obtained from fewer shares. The decoding method in a very VC theme involves inspecting the stacked shares with the unaided eye while not computation. The ciphering model of VC is comparable to a one-time pad within the sense that every image is decrypted with a unique set of shares, and provides high security to the protected secrets.

Following the pioneering research of Noar and Shamir, Ateniese et al. extended the VC scheme to general access structures where the dealer can specify all qualified and forbidden subsets of participants, with participants in a qualified subset being able to reveal the key within the image and people in a very taboo set not having the ability to try and do therefore. In general, there square measure 2 vital parameters for a VC scheme: 1) the element enlargement, which refers to the number of pixels in a share used to encode a pixel of the secret image and 2) the contrast, which is the luminance difference between black and white pixels in the reconstructed image. For a VC theme, a smaller pixel expansion benefits the printing out and storage of shares and a high contrast makes the revealed secret easier to recognize by the unaided eye.

The conditions of most distinction and minimum element enlargement for a VC theme are mentioned previous. Proposed progressive VC schemes using more flexible decryption effects to produce higher quality images stack increasing numbers of shares. There have also been some VC schemes proposed for sharing non-bi-level secrets.VC schemes reported in the literature usually process the content of an image as a single secret; that is, all of the pixels within the secret image square measure shared employing a single coding rule. This type of sharing policy reveals either the whole image or nothing, and hence limits the secrets in an image to have the same secrecy property. A technique for recursively concealment secrets in VC was projected by hierarchically embedding multiple secrets of various sizes at various levels of a picture. There have additionally been efforts to share multiple secrets in 2 pictures.

All of these methods are based on superimposing the two shares at different angles. "In this paper, we tend to think about the content of a secret image with multiple regions, wherever every region includes a particular sure level of secrecy". In this scheme, the secrets in the original image are hidden in such a way that more levels of secrets are revealed when more shares are obtained in the decoding process. This property of progressive revealing of the quantity of secrets in a picture widens the attainable applications of VC schemes.

2 .DESIGN STRATEGY:

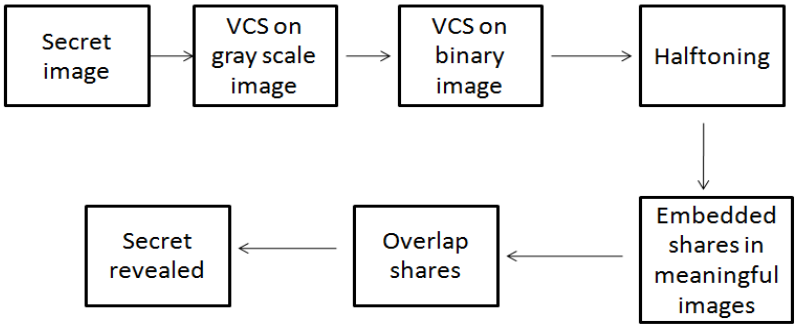

Fig 2(a): Design Strategy

Error Diffusion:

Error diffusion may be a style of 0.5 toning within which the division residual is distributed to neighboring pixels which haven't nonetheless been processed. Its main use is to convert a multi-level image into a binary image, although it's different applications. Unlike many domestic partner toning ways in which, error diffusion is classed as a locality operation, as a result of what the algorithmic rule will at one location influences what happens at alternative locations This means buffering is needed, and complicates parallel processing. Point operations, like ordered dither, don't have these complications.

Error Diffusion has the tendency to reinforce edges in a picture. This can create text in pictures additional clear than in spouse toning techniques

Error diffusion takes a monochrome or color image and reduces the amount of division levels. A popular application of error diffusion involves reducing the amount of division states to only 2 per channel. This makes the image appropriate for printing on binary printers like black and white optical device printers.

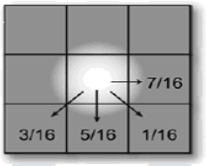

Fig2(b): Floyd's error diffusion algorithm

Pixel Reversal:

A halftone image is generated by the method of blue noise half toning, or pixel reversal if a complementary pair of halftone images is necessary. Recall that the complementary try of halftone pictures employed in the 2-out-of-two halftone VC theme guarantees that the superposition of normal pixels in two halftone cells area unit all black. Hence, all secret pixels may be systematically decoded mistreatment constant visual threshold. In a similar fashion, the halftone image assignment within the general theme should satisfy that any qualified set of participants contains a minimum of one complementary try of halftone pictures.

Halftoning:

Halftone is that the reprographic technique that produces continuous tone imagination through the use of dots, variable either in size or in spacing. 'Halftone' may also be accustomed refer specifically to the image that's made by this method.

Where continuous tone imaging contains a very large vary of colours or gray, the halftone method reduces visual reproductions to a binary image that's written with only one color of ink. This binary copy depends on a basic optical phenomenon that these little halftone dots area unit intermingled into sleek tones by the human eye.

Digital halftoning has been replacement photographic halftoning since the 1970's once 'electronic dot generators' were developed for the film recorder units connected to color drum scanners created by corporationssuch as Crosfield Electronics, Hell and Linotype-Paul.

All halftoning uses a high frequency/low frequency dichotomy. In photographic halftoning, the low frequency attribute could be a native space of the output image selected a halftone cell. Each equal-sized cell relates to a corresponding space (size and location) of the continuous-tone input image. Within every cell, the high frequency attribute is a centered variable-sized halftone dot composed of ink or toner. The magnitude relation of the inked space to the non-inked space of the output cell corresponds to the light or grey level of the input cell. From an acceptable distance, the human eye averages each the high frequency apparent grey level approximated by the magnitude relation at intervals the cell and also the low frequency apparent changes in gray level between adjacent equally-spaced cells and targeted dots.

Digital halftoning uses a formation image or ikon inside that every monochrome pixel or pel is also on or off, ink or no ink. Consequently, to emulate the photographic halftone cell, the digital halftone cell should contain teams of monochrome pixels at intervals the same-sized cell space. The fastened location and size of those monochrome pixels compromises the high frequency/low frequency classification of the photographic halftone technique. Clustered multi-pixel dots cannot "grow" incrementally however in jumps of 1 whole pel. In addition, the location of that pel is slightly eccentric . To minimize this compromise, the digital halftone monochrome pixels should be quite tiny, listing from 600 to a pair of,540, or more, pixels per in.. However, digital image processing has additionally enabled additional refined video digitizing algorithms to choose that pixels to show black or white, a number of that yield higher results. than digital half toning.

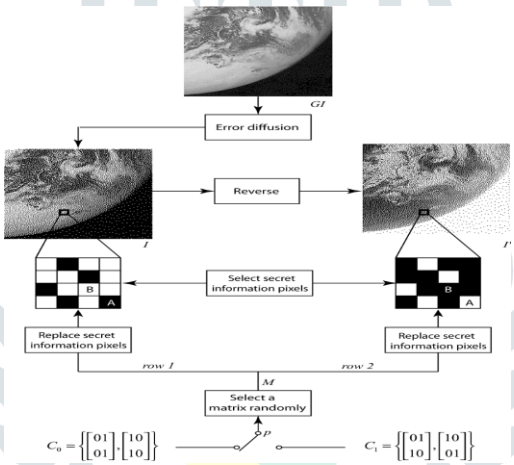

Fig2(c): Construction of a two-out-of-two scheme. Cell size is Q = 4

3.RESULTS:

Fig 3(a): Input Image

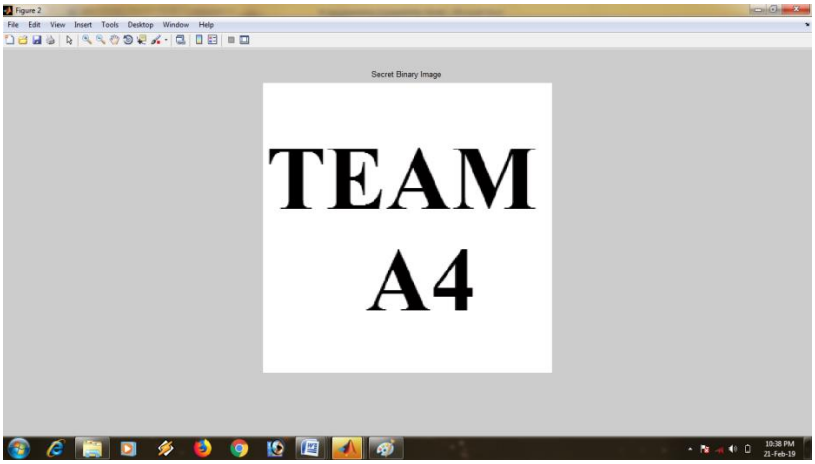

Fig 3(b): Secret Binary Image

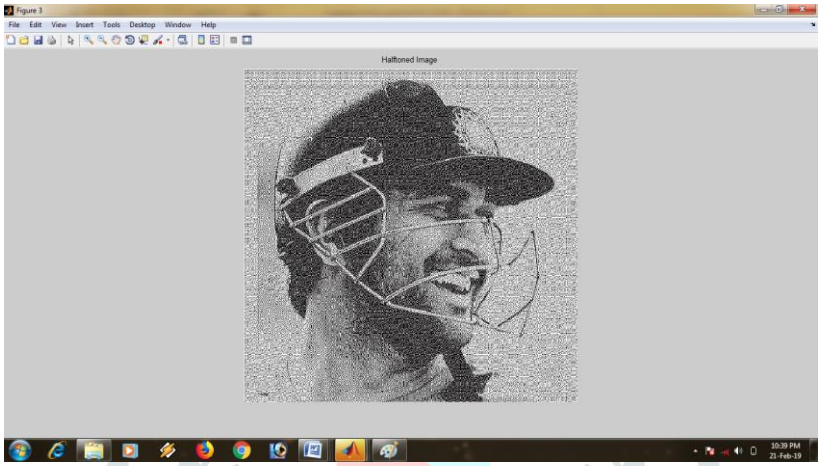

Fig 3(c): Halftoned Image

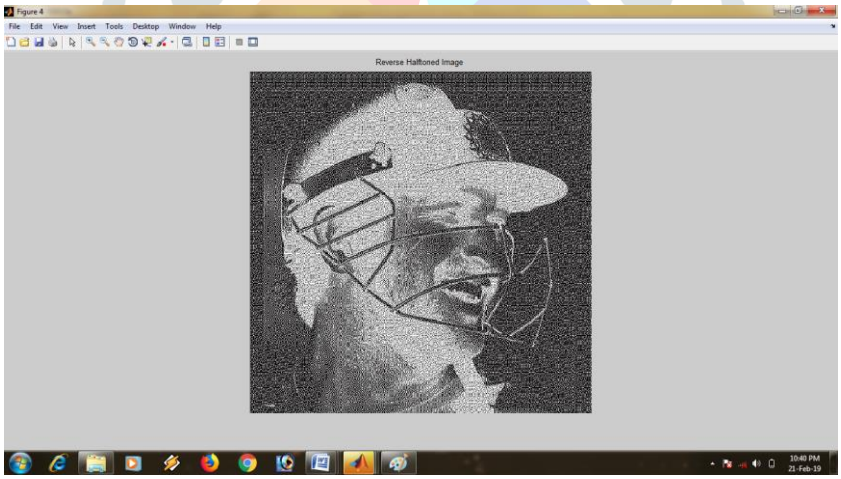

Fig 3(d): Reverse Halftoned Image

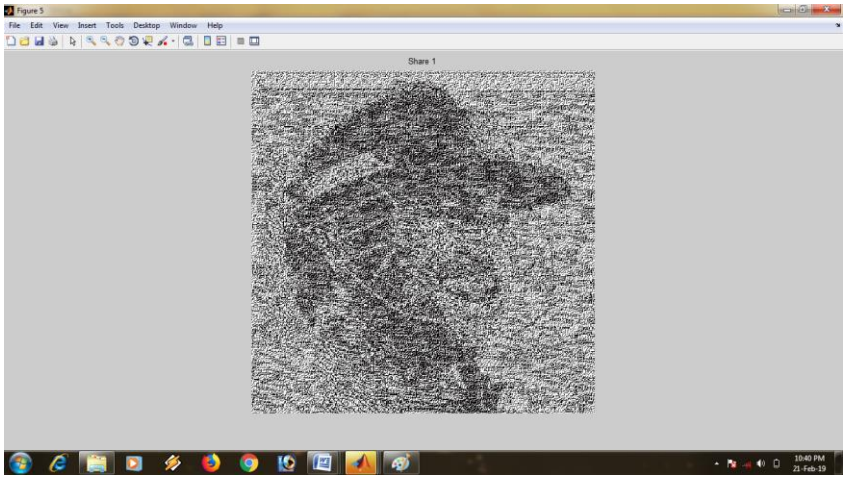

Fig 3(e): Share 1

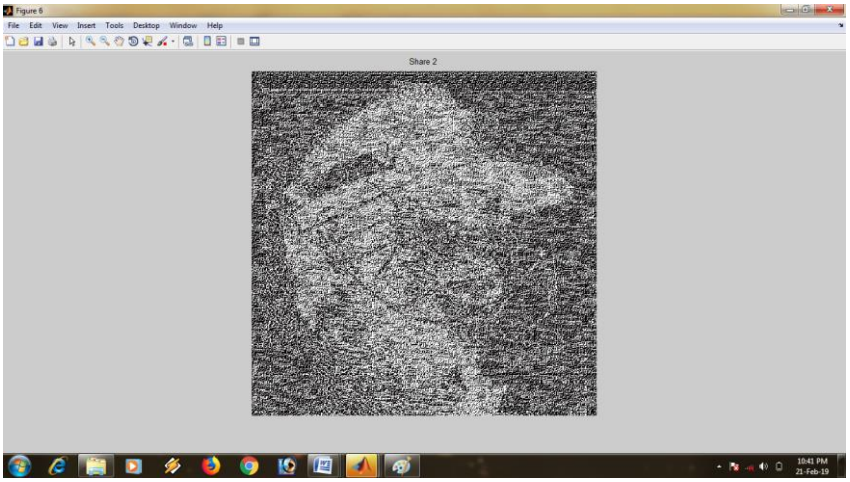

Fig 3(f) :Share 2

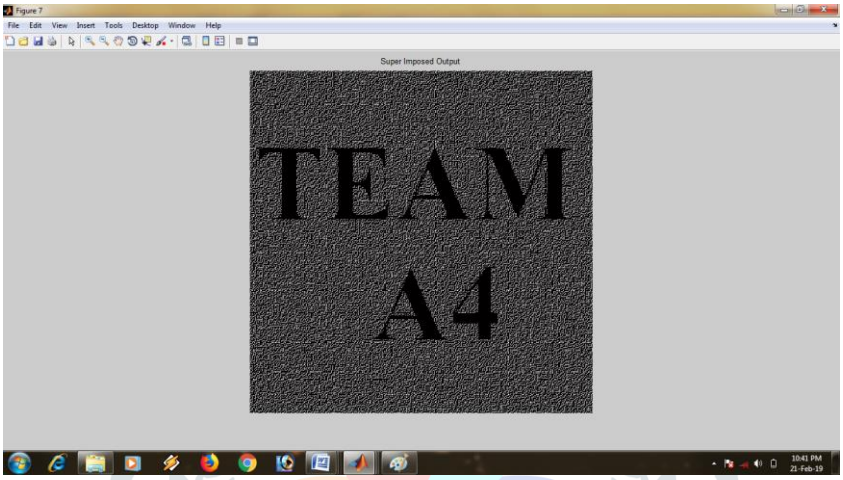

Fig 3(g): Super Imposed Output

4 .ADVANTAGES AND DISADVANTAGES

4.1 ADVANTAGES:

- Simple to implement.
- Decryption algorithm not required (Use a human Visual System). So a person who don't know about cryptography will also able to decrypt the message.
- We can send cipher text through FAX or E-MAIL.
- Lower computational cost since the secret message is recognized only by human eyes and not cryptographically computed.

4.2 DISADVANTAGES:

- The contrast of the reconstructed image is not maintained.
- Perfect alignment of the transparencies is troublesome.
- Its original formulation is restricted only to binary images. For colored pictures extra process should be done.

5.APPLICATIONS AND FUTURE SCOPE

5.1 APPLICATIONS:

- Biometric security
- Watermarking
- Steganography
- Printing and scanning applications
- Bank customer identification
  - Bank sends customer a set of keys in advance
  - Bank web site displays cipher
  - Customer applies overlay, reads transaction key
  - Customer enters transaction key

5.2 FUTURE SCOPE:

Visual Cryptography is the techinique used for a secured communication between two end users. This technique can be modified in such a way that a better quality image can be obtained. Embedded security algorithm can also be used in visual cryptography which makes a revolutionary change in biometric and steanography applications.

6.CONCLUSION

In this project, a general framework of halftone visual cryptography is proposed. Applying the rich theory of blue noise halftoning into the construction mechanism of conventional VC, the proposed method generates visually pleasing halftone shares carrying significant visual information. The obtained visual quality is better than that attained by any other available VC method known to date. The new technique will be broadly speaking utilized in variety of visual secret sharing applications that need high-quality visual pictures, like watermarking, electronic money, etc.

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