

A Survey on Visual Cryptography

Ms. Tejaswini U. Mane, Ms. Aishwarya M. Lonkar

Abstract

In early day when the people used to communicate with each other but wanted to hide the information from the third person at that time they were using the sign language to communicate. With help of sign language, they used to pass the message to each other. Day by day there was development in the system for hiding the information. The information can be hide in the image, passage, alphabets, coding, etc. But that hidden message can be sometimes achieved by the third unauthorized person so the method cryptography was introduced, and then the visual cryptography was introduced. This method is used to transfer the secret information's.

Keywords: cryptography, visual cryptography.

1. Introduction

Visual cryptography is the way of hiding the information in image format which can be revealed with the help of the eyes. More than one images are been shared to more than one person than in that one person have the original information and others have the black and white pixels and when all of them are brought together then the information is been accessed.[1]

2. Cryptography:

Cryptography is nothing but the method of hiding the information. Encryption and decryption of the information is been done. Cryptography is effective method to transmit the information for one person to another authorized person who can access the information. It can protect the sensitive information about particular thing which is stored and in transmitted with network protocol. Now a days the communication takes place through social media and the information are been passed through email and different sites so the information can be hacked by third person which does not have the authority of that particular information. So the encryption of that information is must needed. Encryption of that information will help the sender and receiver to keep the information in the secret, even the hackers can hack the information.[2][4]

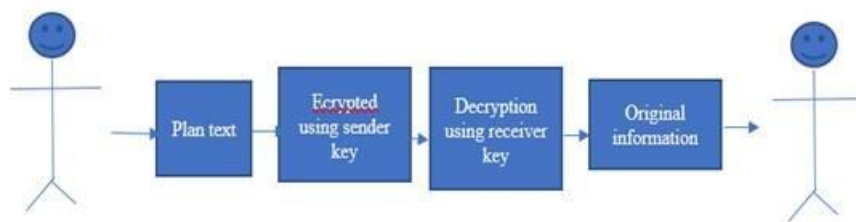


Fig 2.1. Encryption and Decryption

Use/Application:

- Secure communication.
- Hiding information.
- Atm.
- Email and password.

Advantages:

- It is used to hide the main information about the particular thing.
- The information hidden cannot be access by the unauthorized person.
- The information can be decrypted only by the person who is having the key code of that encrypted information.

Disadvantages:

- As the information is hidden in form of pixels then the size of that information is larger then the original information than at the time of decryption some information can be lost.
- The arrangement of the information can give the trouble.

3. Need of cryptography:

Cryptography is needed to secure the information while transmitting it. As the information in encrypted the information will not be changed by the third unauthorized person. The message which is been send can't be ready by someone else. The encrypted information can be used to in military to send the information by the commander to the soldiers on the field. Now a days we can see that people have many different sites access and even have the different password of each site so to keep that password of sites secured the encryption of that password can be done.

4. Terminology

Below is the example of encryption of the information, now we can see in above example that the A alphabet is been replaced by the letter D which is after three shifts in same way other all the alphabets are been encrypted. We can take the example of word

“HELLO”, with the help of about method we encrypt the word HELLO with the help of three shift then the encrypted information will be “KHOOR”, and the key for decryption of the information which will tell that third letter before the encrypted information is the original information, we can take key as “WET”.

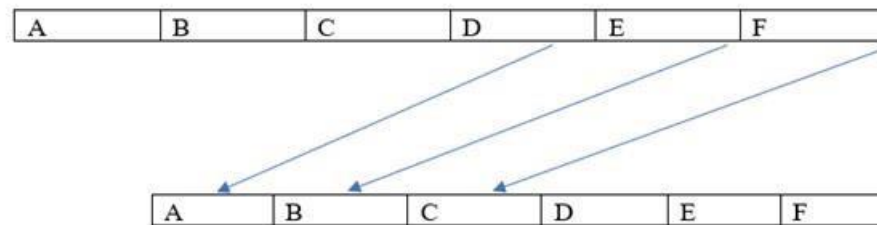


Fig 4.1. cryptography technique

5. Visual cryptography

The visual cryptography is the method of hiding the information in the form of the image, that hidden information can be decrypted by the visual way if the correct image is been used. In visual cryptography more than two images are been used in which if we consider two images then one image is of random pixels and other image is of the hidden information. If we want to reveal the hidden information then at that time both the images are computer.[5]

5.1. Visual cryptography for black and white image:

1. **Binary image:**In this method there are two different binary images and the information is encrypted on that binary image and that image are overlap on each other with help of the angle and then the decryption of the information is been done.
2. **Circular image:**This method is 2x2 scheme the two images are in the circular manner and that images are overlap each other and then that images show the circular shadow image output of the information which is been hidden in that images.[1]

5.2. Visual cryptography for color image:

1. **Sharing single information at a time:** In this method only single pixel information is been transfer. In this in one image the information is been transfer then that information in converted into form of pixels and then that pixels are again divided into sub pixel then. In this only one pixel is color pixel remaining all the pixel are black. In this way single color information is been shared.
2. **Sharing multiple information at a time:** In this method two images are been transfer and then on that two images there are two different information stored. If we consider image A and B then when we overlap the image B over the image A then we can get the information which is been encrypted in image A and in same way if u under the image A in opposite way and place it over image B then we will get the information which is been encrypted on image B.
3. **Visual cryptography without key:** In this method there is no use of the key for the encryption of the information. We can consider that there are 3 color images then that images are further divided into sub images, we and name that sub images as A and B. The this divide sub images are made separated and then the random combination of that sub images is been done in two images.

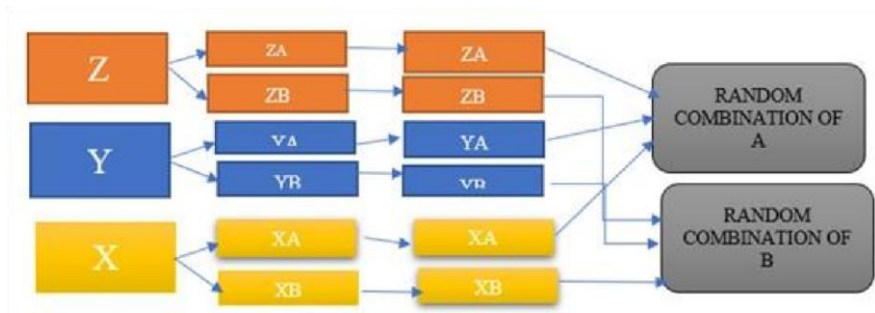


Fig.5.2.3. Cryptography for color image

4. Visual cryptography with key:

The above cryptography which does not use the key save the complexity. But in this method the key is been used for the security of the image which will keep it safe.[3]

Use/Application:

- Biometric security.
- Watermarking.
- Remote electronic voting.
- Bank customer information. - Army.

Advantages:

- As in this encryption of the information doesn't requires the problem dependency so the decryption algorithm is not required.
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Disadvantages:

- The time can be taken for decryption of the information.
- The arrangement the information and distributing of the pixel will

6. Comparison of algorithm used:

Table 1. Algorithms used for Cryptography and Visual Cryptography.

Algorithm	Type	Method	Strength	Replaced by
AES	Symmetric key is used	128-bit block cipher	It is strong	N/A
SHA-1	Hashing – integrity	Rivest SHA hash	It is very strong	N/A
RSA	Asymmetric key	Key transport	It is strong	N/A
HMAC-MD5	Integrity – authenticity	Keyed digest	Very strong	N/A
DES	symmetric key is used	64-bit block cipher	It is very weak	3DES
3DES	Symmetric	64-bit block cipher	Moderate	AES

7. Future scope

The information will be transmitted in highly secured manner through different way like video, audio, etc. This can also be used in the military to hide the information which should not be accessed by the unauthorized user.

Conclusions

This method is now a days used by many peoples and companies for exchanging the secret information about the particular thing. This help to share the information in safe which will not be accessed by the unauthorized users. It even store the information in n number of the images which ben shared and when they are brought together that time the original information is been obtained

References

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