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FAST IMAGE ENCRYPTION BASED ON RANDOM IMAGE KEY

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Abstract
Internet plays an important role in circulating a huge amount of multimedia. An example of this multimedia is the image. To send an image over the network secretly, the sender tries to find encryption algorithm to hide image information. This paper aims at designing an efficient encryption algorithm for color image using random image key generated with minimum time execution for encryption and decryption operations. XOR operation is used here to make more diffusion of the encrypted image to maintain a higher level of security upon transference than it is with the original image.

Keywords – Encryption, Decryption, Random Key, XOR operation.

1. INTRODUCTION

Network technologies and media services provide ubiquitous conveniences for individuals and organizations to collect, share, or distribute images/videos in multimedia networks and wireless or mobile public channels. Image security is a major challenge in storage and transmission applications. As a matter of fact, all users, who use multimedia such as image, audio, video and text, may need to protect information from attacks during sending or receiving them through channel. There are two challenges for multimedia encryption; the first one is the size of data and the second is the cost of encryptions . In this paper, an image encryption method based on a new random key generated from the same image is going to be adopted.. Image Crypto system can be classified into two main sections; one for encryption and the other for decryption. In this paper a new algorithm is proposed to encrypt color image using symmetric key which is generated from the same image or any image can be selected. Some tests are applied here to determine performance algorithm. These are histogram, mean square error, peak signal to noise ratio, entropy, correlation coefficients, number of changing pixel rate and unified averaged changed intensity . The proposed algorithm was satisfied with good results where speed of running was good for encryption and decryption algorithm.

2. RELATED WORK

In this section many studies are summarized here to survey some ideas about the image encryption during the last years. Pratibha S.Ghode et al improved a keyless method for image cipher in lossless color images to encrypt and decrypt image without any loss of data quality. Khanzadi H. et al proposed an image encryption algorithm using bit sequence random generator based on Chaotic Logistic and Tent maps. Mirzaei et al introduced a new parallel algorithm for image encryption. First of all, the plain image is divided into 4 equal blocks and then the position of each block is shuffled. Then a total shuffling algorithm is applied to the whole image. After this, we use different values for encrypting each pixel in each of the 4 blocks of the whole image.

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3. PROPOSED FRAMEWORK

Fast algorithm is proposed here to encrypt and decrypt color image. Proposed algorithm applies for any size of image. In symmetric image encryption, the sender and the receiver must share the same key. In this paper, a new algorithm is designed to generate image key from the same image or any image selected by the sender. XOR logic plays the main role in this algorithm. The basic idea is cutting the picture where not everyone can recognize them, especially if it has been cut horizontally and vertically into smaller parts as much as possible. In this paper, image key is generated according to this idea by rotating the origin image to three directions.

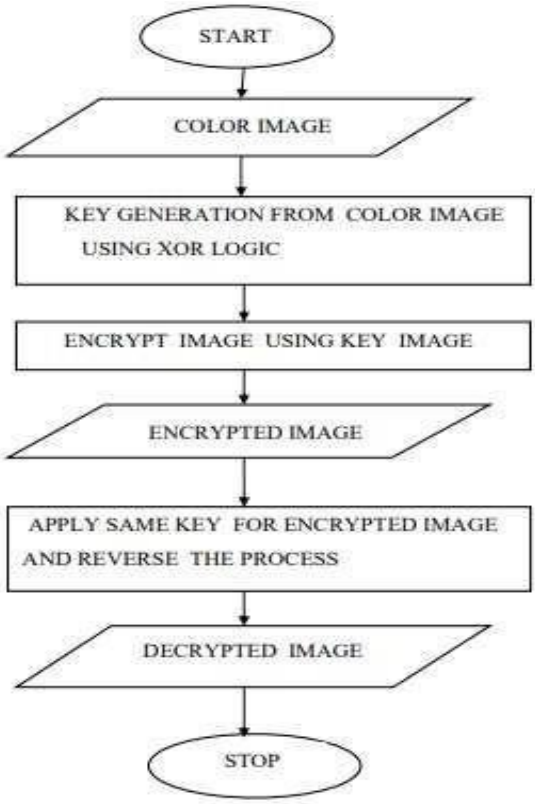

Fig1.Flow Chart

4. EXPERIMENTAL RESULTS

Image Key Generating Algorithm Steps:

1 .Input color image
2. Rotate color image to three directions (left,right and down).
3. Cutting and random permutation each image which get from step 1 and 2.
4. Generate primary key from step3 using XOR logic.
5. Analysis primary key to three channels (R,G and B).
6. Flip R to three directions (left to right up to down and right to left)
7. Rotate R and flip it to three directions (left to right, up to down and right to left)
8. For all matrixes generated in steps 6 and 7 use XOR to get new R.
9. Repeat steps from 6-8 to get new G and New B.
10. Reconstruct R, G and B to new image.
11. Use XOR between origin image in step1 and new image in step 9.
12. Analysis image in step 11 to three channels (R G and B).

Apply XOR for R, G and B to generate image key

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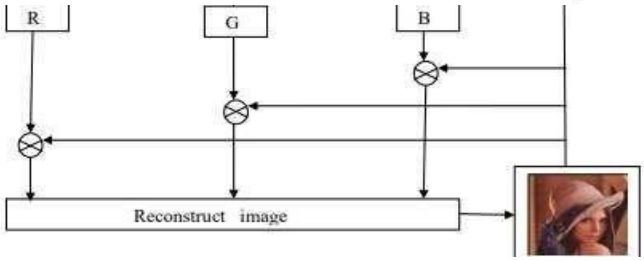

Fig 2.Image Encryption

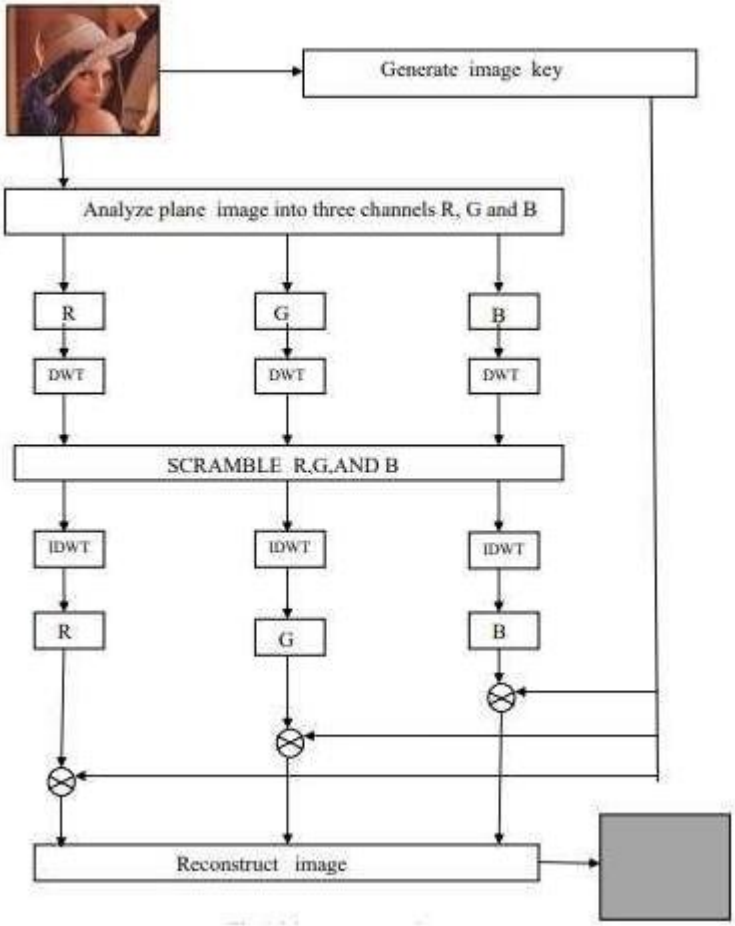

Fig 3.Image Decryption

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Fig 4.Input Image

Fig 5.Generated key image

Fig 8.Parameters of image

5. CONCLUSION AND FUTURE WORK

The color image encryption and decryption algorithm is proposed and implemented depend on fast image key. Image key can generate from the same image or any image must the same size of origin color image. The sender and receiver shared the same image key which has the same properties of hash function therefore, the attacker cannot discover the plain image from the image key notably, if one pixel value is changed, different key will generated. Proposed algorithm give a good results through applied some statistical tests as well the proposed algorithm achieved encryption rate about 0.134136 and 0.106204 for decryption rate.

Finally, it is possible to encrypt partial image instead of full image encryption. Also it can be applied as a block cipher instead of stream cipher to get good results. As well as it can be developed by compression of the plain image with image key to reduce the cost of data transition.

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