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# Secret Fragment Visible Mosaic Scheme for Secure Transmision

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**Abstract:** ***Mosaic means picture or decorative design made by setting small colored pieces, as of tile, into a surface. Also mosaic is a composite picture made of overlapping images, photos etc. This is the new type of proposed system use for secure transmission in which tiles is nothing but the no. of fragments of secret image. In this create a mosaic image by fitting tile into target image for the secure transmission of images through the internet it also called secret fragment visible mosaic images. The transmission of image is control by randomly generated key. And person who gets that key can recover the original image from the mosaic image, otherwise original image cannot recover. At the time of recovery of the original image it uses the embedded information from mosaic image. Recovery of the secret image from mosaic image is lossless recovery.***

**Keywords:** Color transformation, image encryption, mosaic image, secure image transmission.

## 1. Introduction

Currently, in today's era images from different-different sources are transmitted and share through the internet which contain the personal and confidential information such as medical image, confidential information, military images personal data, etc. for that we can protect it from leakage at the time sharing such type of image. There are many methods proposed for that secured purpose for example image encryption, data hiding, etc. In the image encryption image is encrypted in form of meaningless noise image in the random format and due to that randomness hacker's attention will be towards that encrypted image. And it does not contain any information about decryption of image.

And in the data hiding small data is hide in the image but again disadvantage of data hiding is large number of data is not hide in the single image an also due compression lots of data will be loss. One of the type of image, called secret fragment visible mosaic images, which contains small tiles of a given secrete image which we want to fit and proposed in this study. Observing the created mosaic image, no one can see all the fragments of the secrete image, because the fragments are small in size and so it is random in position that the observer cannot figure out what the secrete image looks like. Therefore, the secrete image is secretly embedded in the resulting mosaic image, due to which the fragments are not visible to everyone.

And due to that mosaic image is known as secret fragment mosaic. Because of this characteristic of the new mosaic image, it may be used a carrier of a secret source image in the disguise of another a target image of a different content. This is a new technique of information hiding, not found in the literature so far. It is useful for the application of covert communication or keeping it secure.

More specifically, a secret image is firstly divided into number of rectangular fragments, called tile images, which are fitted next into a target image selected from a database to create a mosaic image. The number of usable tile images for this operation is limited by the size of the secret image and that of the tile images. Then, the information about fitting of tiles is fixed into some blocks of the mosaic image, which are selected randomly by a secret key. Accordingly, an observer used the key to reconstruct the secret image by retrieve the implanted information, while a hacker without the key cannot find image.


**Figure 1:** (1) Secret image (2) Target image

In the above figure there are two image first contains the secrete image which we want to secretly transfer from sender to receiver by fitting it in the target firstly secret image is divided into number of tiles which we want to fit into target image. After fitting the tiles we get the mosaic image containing information related to recovry. When we select the secret image then by equally croping it converted into number of equal tiles and selected target image having the equal size with the secret image. If size of the secret image and target image is not same then make it same or select target image having same size as that of secret image.

This paper has following structure : section 2 contain the proposed method of the implementation of the system. section 3 contains the conclusion of flow of the system.

## 2. Proposed method

Following is the flow diagram of the proposed method is shown in fig 2 in which includes two phases of works.

Phase 1 − making of a mosaic image using the tile images of a secret image and the selected related target image as input, In the first phase, a mosaic image is yielded, which consists of the fragments of an input secret image with color corrections according to a similarity criterion based on color variations. The phase includes four stages:

1) Fitting the fragmented tiles of the secret image into the target blocks of a preselected target image;
2) Transforming the color characteristic of each tile of the secret image to become corresponding target block in the target image.
3) Rotating each tile image in such a way that with the minimum RMSE value with respect to its corresponding target block.
4) Embed related information into the created mosaic image for recovery of the secret image.

Phase 2 − revival of the secret image from the created mosaic image. In the second phase, the embedded information is extracted to recover nearly lossless the secret image from the generated mosaic image. It includes two stages:
1) Extract the implanted information for secret image recovery from the mosaic image, and
2) Recovering the secret image using the extracted information.

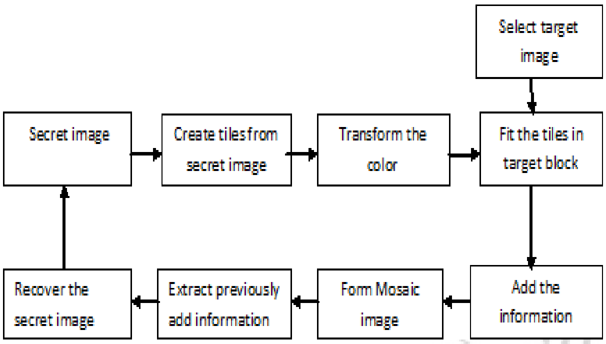



**Figure 2:** Flow diagram of proposed method

In the above figure there is secrete image of that it will converted into number of tiles then tranform the color characteristics that image into anthor then select target image fit tiles into that target image and add some information releted to recovery of image form a mosaic image the for recovery of image extract add information and we get secret image back. Secret-fragment-visible mosaic image creation. Based on the above discussions, a complete algorithm implementing the proposed idea for creating mosaic images is described in the following, followed by some experimental results.

### 2.1 Mosaic Image Creation Algorithm.

Input: a secret image S with a pre-selected size Zc; a pre-selected size Zt of tile images; a database DB of candidate target images with size Zc; and a random number generator g and a secret key K.
Output: a secret-fragment-visible mosaic image U for S.

**Stage 1** − selecting the most similar target image.

Step 1. Divide S into tile images of size Zt, record the width WS and height HS of S, and compute the number N of tile images in S by Eq.

Step 2. Select from DB the target image Do that is the most similar to S in the sense of Eq.

**Stage 2** − fitting tile images into target blocks.

Step 3. Calculate the h-feature values of all the tile images in S and take out the h-feature values of all the target blocks of Do from DB.

Step 4. In a raster-scan order of the target blocks in Do, perform the greedy search process to find the most similar tile images si, sj, sk, … in S corresponding to the N target blocks d1, d2, d3, … in Do, respectively, to construct the h-feature values obtained in the last step.

Step 5. Fit the tile images si, sj, sk, … into the corresponding target blocks d1, d2, d3, …, respectively, to generate a preliminary secret-fragment-visible mosaic image U.

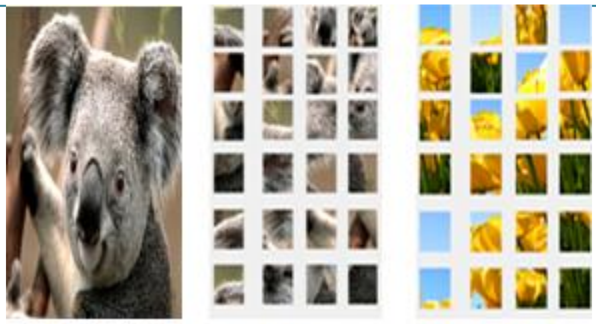
**Stage 3** − Embedding tile-image fitting information.

Step 6. Combine the data of the width WS and height HS of S as well as the size Zt, transform the concatenation result into a binary string, and embed it into the first ten pixels of the first block of image U in a raster-scan order by the lossless LSB replacement scheme proposed in .

Step 7. Transform LR into a binary string with its length NR computed by Eqs.

Step 8. Repetitively select randomly a block sin U unselected so far other than the first block of U using the random number generator g with the secret key K as the seed, and embed NT bits of LR into all the Zt pixels of s by the lossless LSB replacement scheme proposed in, until all the NR bits in LR are exhausted, where NT is
computed by Eq.

Step 9. Take the final U with LR embedded as the desired secret-fragment-visible mosaic image for the input secret image S and exit.



(1) (2) (3)

**Figure 3:** (1) Secret image (2) Tile of secrete image (3) Target block

### 2.2 Secret Image Recovery

Input: a mosaic image F with n tile images {T1, T2, . . . ,Tn} and the secret key K.

Output: the secret image S.

**Stage 1**. Extracting the secret image recovery information.

Step 1. Extract from F the bit stream I by a reverse version of the scheme proposed in and decode them to obtain the following data items:
1) the number of iterations Ni for embedding Mt;
2) the total number of used pixel pairs Npair in the last iteration; and
3) the Huffman table HT for encoding the values of the residuals of the overflows or underflows.

Step 2. Extract the bit stream M_tusing the values of Ni and Npair by the same scheme used in the last step.

Step 3. Decrypt the bit stream M_t into Mt by K.

Step 4. Decompose Mt into n bit streams M1 through Mn for the n to-be-constructed tile images T1 through Tn in S, respectively.

Step 5. Decode Mi for each tile image Ti to obtain the following data items: 1) the index ji of the block Bji in F corresponding to Ti; 2) the optimal rotation angle θ° of Ti; 3) the means of Ti and Bji and the related standard deviation quotients of all color channels; and 4) the overflow/underflow residual values in Ti decoded by the Huffman table HT.

**Stage 2**. Recovering the secret image.

Step 6. Recover one by one in a raster-scan order the tile images Ti, i = 1 through n, of the desired secret image S by the following steps:
1) rotate in the reverse direction the block indexed by ji, namely Bji, in F through the optimal angle θ° and fit the resulting block content into Ti to form an initial tile image Ti;
2) use the extracted means and related standard deviation quotients to recover the original
pixel values in Ti .
3) use the extracted means, standard deviation quotients, and to compute the two parameters cS and cL.

4) scan Ti to find out pixels with values 255 or 0 which indicate that overflows or underflows, respectively, have occurred there; 5) add respectively the values cS or cL to the corresponding residual values of the found pixels; and 6) take the results as the final pixel values, resulting in a final tile image Ti.

Step 7. Compose all the final tile images to form the desired secret image S as output.

## 3. Conclusions

In this we have proposed a new method for secure image transmission for secret fragment visible mosaic image. In this we can convert secret image into meaningful mosaic image and recover the lossless secret image from that mosaic image. In this transmission of the mosaic image is control by key which is randomly selected from the pixel when receiver enter this key then recover the image. The mosaic image form is look like a pre-selected target image. In the proposed method we have select the target image and the secrete image from any resources such as downloaded, save or any from your system it is advantage of this system. Tile image fitting information for secret image recovery is embedded into randomly selected tile images in the resulting mosaic image controlled by a secret key. An additional security enhancement measure was also discussed.

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