

An Approach to Securely Transfer a Secret Image Using Reversible Color Transformations and HSV Color Model

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Abstract: Images from various sources are frequently used and are transmitted through the internet for various applications, such as confidential enterprise archives, document storage systems, medical imaging systems, and military image databases. These images may contain private or confidential information so that they should be protected from leakages during transmissions. A technique for secure image transmission is needed, to transform a secret image into one meaningful Mosaic tile image with size almost the same and looking like one target image. The mosaic image is the outcome of arranging of the tile fragments of a secret image in different way so as to disguise the other image called the target image which is already selected from a database. The mosaic image, which looks similar to a randomly selected target image, which is used for hiding of the secret image by color transforming their characteristics similar to the tile fragments of the target image. Such technique is necessary so for the lossless recovery of the transmitted secret image. The relevant information embedded into the mosaic image is required for the recovery of the transmitted secret image.

Key Terms—Color transformation, data hiding, encryption of image, mosaic tile image, secure transmission of image.

INTRODUCTION:

Today, images from various sources are frequently utilized and transmitted through the internet for various applications, such as online personal photograph albums, confidential enterprise archives, document storage systems, medical imaging systems, and military image databases. These images usually contain private or confidential information so that they should be protected from leakages during transmissions.

Nowadays, many methods have been proposed for securing image transmission, for which two common approaches are image encryption and data hiding. Encryption of an image is a procedure which use the natural properties of images, such as redundancy and spatial correlation, to get an image already encrypted which use the Shannon's confusion and diffusion properties. The image that is encrypted becomes an image with noise so that no one can obtain the transmitted secret image from it unless having the correct key.

But, the encrypted image still is a meaningless document, which cannot give more information before the decryption is done. Thus, this may evoke an attacker's attention during the transmission of the image because of its arbitrary in nature. Another possibility to avoid this problem is hiding of data that conceals a secret message into another image so that no one can anticipate the survival of the secret text, in which the type of data of the secret message that is examined in this paper is an image. The methods of data hiding already known mostly use the techniques such as LSB substitution, histogram shifting, recursive histogram modification, discrete cosine/wavelet transformations etc.

However, in order to reduce the distortion of the resulting image, an upper bound for the distortion value is usually set on the payload of the cover image. Thus, the main limitation of the methods for data hiding in images is the difficulty in embedding a huge amount of message data into one image. Specifically, if one wants to hide a secret image into another image with the same size, the secret image must be highly compressed in advance. For example, for a data hiding method with an embedding rate of 0.5 bits per pixel, a secret image with 8 bits per pixel must be compressed at a rate of at least 93.75% beforehand in order to be hidden into a cover image. But, for many applications, such as keeping or transmitting medical pictures, military images, legal documents, etc., that are valuable with no allowance of serious distortions, such data compression operations are usually impractical. However, the techniques for compression of images, such as JPEG compression, are not appropriate for line drawings and graphical texts, in which sharp contrasts between neighbouring pixels are usually destroyed to become less noticeable. In this paper, a different method is proposed for the transmission of the image securely. This method transforms the secret image to be transmitted into a meaningful mosaic tile image with the same size which looks like another image which was preselected as the target image. The process of transformation is done with the help of some relevant information that is embedded and only with the help of this embedded information can a person losslessly recover the transmitted secret image from

the mosaic tile image. This proposed method is magnified by Lai and Tsai where an aesthetic type of a new computer image, called mosaic tile image, was proposed. The mosaic tile image is the outcome of arranging of the tile fragments of a transmitted secret image is concealed in another image called the target image which was earlier selected from the database.

REVIEW OF LITERATURE:

This section describes the various existing schemes which are compared in this paper.

1] A New Secure Image Transmission Technique via Secret-fragment-Visible Mosaic Images by Nearly Reversible Colour Transformations,

In this paper, Ya-Lin Lee shows a technique for the transmission of the secret image securely and losslessly.

This method transforms the secret image into a mosaic tile image having the same size like that of the target image which is preselected from a database.

This colour transformation is controlled and the secret image is recovered losslessly from the mosaic tile image with the help of the extracted relevant information generated for the recovery of the image.

2] Reversible Data Hiding in Encrypted Images by Reserving Room Before Encryption,

In this paper, Kede Ma shows a method for data hiding into an image by reserving room before encryption of the image.

This paper shows that first enough space is reserved in the image after which it is converted into encrypted form.

3] A Keyless Approach to Image Encryption, by Indian Institute of Technology Roorkee

This paper shows a keyless approach to encryption methods which are used to encrypt images.

We make the use of this paper to apply the keyless approach in the proposed method. This is done by generating relevant information with the help of some RMSE value which help to rotate the tile images to a certain angle.

4] JPEG: Still Image Data Compression Standard

Here, W. B. Pennebaker tries to explain that the main obstacle in many applications is the quantity of data required to represent a digital image.

For this we would need an image compression standard to maintain the quality of the images after compression.

To meet all the needs the JPEG standard for image compression includes two basic methods having different operation modes: A DCT method for “lossy” compression and a predictive method for “lossless” compression.

NEED OF PROPOSED WORK:

To securely transmit a secret image and recover it losslessly by method of creating a mosaic image using HSV color model.

Embedding text into the secret image to be transmitted by data hiding and to implement keyless approach for secret image transmission.

PROPOSED SCHEME :

The embedding of text into secret image by Data Hiding, the embedding of secret image into the target image in tile form and maintaining the visibility of the original target image.

The proposed method includes

- 1) Mosaic tile image creation
- 2) Secret image and secret text recovery

The result is the mosaic tile image, which consists of the tile fragments of an input secret image which has color characteristics same as that of another target image selected from the database.

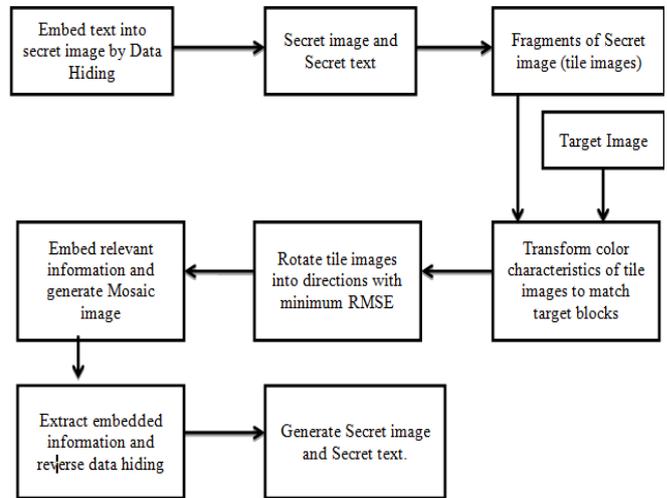


Fig : Flow Diagram

CONCLUSION :

A method is proposed to securely transmit a secret image, which can create mosaic tile images which also can transform a secret image into a mosaic tile image with the same size of data for concealing the secret image.

This is done by the use of proper color transformations pixel by pixel and also using a technique for managing overflowing of the values converted for the pixels colors, in mosaic tile images with large visual similarities.

The original secret image and secret text can be recovered nearly losslessly from the created Mosaic images.

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