A Method for Creating Mosaic Image with Small Size Database

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***Abstract*— This paper introduces a new kind of mosaic image called secret-fragment-visible mosaic image, which is automatically create a target image in a mosaic form by composing small fragments of a given image. Secret image is embedded with the target image secretly in the resulting mosaic image. This information hiding is useful for secure communication. To create a mosaic image we transform a 3-D color secret image into 1-D color space, which is useful for finding similarity target image for secret image. A fast greedy search algorithm is created to find a similar tile image in the secret image to fit into each block in the target image. Lossless least significant bit replacement scheme is used to create a secret key. We cannot recover the secret image without secret key. The proposed method designed for dealing a color image is extended to create grayscale mosaic image, which is useful for hiding text type document image.**

I. INTRODUCTION

Mosaic is a kind of making artwork, which is created by composing small pieces of materials, such as stone, glass, tile, etc. In recent years, mosaic image is created by computer. Different type of mosaic images have been created by computer with different method.

In the remainder of this paper, the initial work of the proposed method is described in Section II. Construction of database discussed in Section III. Mosaic image creation is discussed in Sections IV. Secret Image Recovery is discussed in Sections V. Grayscale and Mosaic Image Creation and Recovery is discussed in Sections VI.Result is discussed in Sections VII. Finally, conclusions and future studies are given in Section VIII.

II. INITIAL WORK OF THE PROPOSED METHOD

A mosaic image is created by following Phase:

Phase 1: Database construction for a color image to selecting similar target images for given secret images.

Phase 2.1: Searching the target image the most similar to the secret image from the database.

Phase 2.2: Creating a mosaic image.

Phase 2.3: Embedding the tile-image fitting information into the mosaic image for later secret image recovery.

Phase 3.1: Embedded tile-image fitting information is retrieved from the mosaic image.

Phase 3.2: Secret image is reconstructed from the mosaic image using the retrieved information.

III. CONSTRUCTION OF DATABASE

Data base is one of the most important technologies in computer world. Database is used to store all type of documents, images, audio files, video files, etc… in this project proposed how to use a small size database for storing mosaic image. Existing system was using large size database, this database storing each pixel color values stored in database it occupy more space in the database. so we proposing small size database. Target images are stored permanently in a database and the secret image is store temporarily in a

database, puzzle image are store temporarily in a database, target image splited into n numbers of blocks. Average rgb values taking from each pixels on the each blocks that values are stored in a database. All target image path also stored in database. Average color value (r, g, b) for the secret image temporarily stored in a database. The use of small tile images in the proposed method, which are the fragments of the secret image, it is found in this study that the most effective feature, which affects the overall visual appearance of the resulting mosaic image, is color. Therefore, we focus on extracting color distributions from images to define an appropriate image similarity measure for use in target image selection. A new color transformation functions as follows:

$$h(x', y', z') = b' + Nz \times x' + Nz \times Nx \times y'$$

Where, the numbers of levels, N_x, N_y and N_z , are all set to be 8, and the largest weight, namely, the value $N_z * N_x$, is assigned to the green channel value y' and the smallest weight, the value 1, is assigned to the blue channel value z'. We propose a new feature for each image block (either a tile image or a target block), which is called h-feature.

IV. SECRET-FRAGMENT-VISIBLE MOSAIC IMAGE CREATION IMAGE

Before generating the secret-fragment-visible mosaic image for a given secret image with the preselected size, we have to choose from the database DB a target image which is the most similar to Secret image. For this, first we divide into blocks of the preselected size, compute the h-feature values of all the resulting blocks, and generate the h-feature histogram for target image. Then, we define an image similarity value between and each candidate target image with h-feature histogram in DB. After calculating the image similarity values of all the candidate target images in DB with respect to secret image, we select finally the image in DB with the largest similarity as the desired target image for use in mosaic image creation.

A. Selecting the most similar target image

First take the secret image S and divide into 9 tiles. And select the most similar target image D from DB.

B. Fitting tile images into target blocks

Calculating the h-feature values of all the tile images from the secret image and take out the h-feature values of all the target blocks of D_o from *DB*.

In a raster-scan order of the target blocks in D_o, perform the greedy search process to find the most similar tile images $s_1, s_2, \ldots s_9$ in S and corresponding to the N target blocks $d_1, d_2, \ldots d_9$ in D_o , respectively, to construct the secret recovery sequence L_R=0,1,..9 Using the h-feature values. And finally, fit the tile images $s_1, s_2, \ldots s_9$ into the corresponding target blocks $d_1, d_2, \ldots d_9$ respectively, to generate a preliminary secret-fragment-visible mosaic image U .

C. Embedding tile-image fitting information

Concatenate the data of recovery key for the secret image S and transform the concatenation result into a binary string, and embed it into the first ten pixels of the first block of mosaic image U in a raster-scan order by the lossless LSB replacement scheme. Take the final Mosaic image U with L_R embedded as the desired secret-fragment-visible mosaic image for the input secret image S.

V. SECRET IMAGE RECOVERY

A. Retrieving tile-image fitting information

Retrieve the recovery key of the tile images from the first ten pixels in the first block of image in a raster-scan order using a reverse version of the lossless LSB replacement scheme. Repetitively select randomly an unselected block other than the first block from using the random number generator with the secret key, extract bits from all the pixels of using a reverse version of the lossless LSB replacement scheme proposed. Transform every bits of LR into an integer which specifies the index of a tile image in the original secret image (to be composed), the secret recovery sequence resulting is LR= 0, 1,..9.

B. Reconstructing the secret image

Construct the mappings of the indices of the tile images of the original secret image S (to be composed next) to those of the corresponding target blocks of U. For example, U as 0=1,1=2,2=4,3=6,4=0,5=3,6=5,7=6,8=7,9=8.

The tile images of the secret image S in a raster-scan order according to the N mappings by taking block 1 of U to be tile image 0=1 in S, block 2 of U to be tile image 1=2 in S , and so on, until all blocks of are fitted into S.

VI. GRAYSCALE MOSAIC IMAGE CREATION AND RECOVERY

It is often encountered that the secret image is a grayscale one. This could happen when the image is obtained, through various ways like scanning, from paper documents mainly with text contents. The selected target image obviously should be of the same type, namely, a grayscale image; and the

generated mosaic image is also a grayscale one. First, the color image database should be converted into a grayscale version. For this, the color values (r, b, g) of every pixel in each image in the database is transformed in this study into a 1-D grayscale value Y by the equation Y=0.177*x+0.813*z+0.011*y where the weights for x, y and z are taken to be the coefficients of the Luminance (the component) used in the transformation from the RGB model to the YUV one. The reason for adopting such weights instead of the conventional value of 1/3 for each color channel is based again on the previously-mentioned human eye's higher sensitivity to the green color. Then, the average of the grayscale values of all the pixels in each image block is computed as a feature, called the Y-feature. This feature is used further as a measure like described previously in the database construction process to compose the Y-feature histogram of each candidate target image D in the database. A similar grayscale histogram is also constructed for the input grayscale secret image S. Then, we define an image similarity value between and each candidate target image with Y-feature in DB. After calculating the image similarity values of all the candidate target images in DB with respect to secret image, we select finally the image in DB with the largest similarity as the desired target image for use in Grayscale mosaic image creation.

VII. RESULT

An Experimental Result *we* create mosaic image using the secret image and target image, respectively. We extract secret image from mosaic image using with secret key. if we use wrong secret key , which extract a noise image. Parameter embedding and the tile images are fitted into the target blocks, which use scheme of the lossless LSB replacement with no change. Therefore, we proposed method is a *lossless* secret image hiding method.

VIII. CONCLUSION AND FUTURE STUDIES

This paper introduces a new kind of mosaic image called secret-fragment-visible mosaic image , which is automatically create a target image in a mosaic form by composing small fragments of a given image. Secret image is embedded with the target image secretly in the resulting mosaic image. This information hiding is useful for secure communication. The most similar tile block of target image for a secret image is detected by using the greedy search algorithm. The LSB scheme is used for generating the secret key. we cannot recover the secret image without secret key. This method is extended to generate grayscale mosaic images with grayscale secret images as input. Good mosaic image creation results are guaranteed only when the database is small in size so that the selected target image can be sufficiently similar to the input secret image. . Future works may be without using a database, to allowing users to select target images.

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