Secure Video Transmission Based On SFVMV Technique

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Abstract— **Secure data transmission through internet is one of the main issues in communication. This paper focuses on the secure method of video transmission, for protecting the leakage of data via internet. This method is the combination of secret fragment visible mosaic image transmission and audio scrambling. Here video is transmitted as the combination of mosaic image frames and scrambled audio. The video transmitted is similar to the target video selected with scrambled audio. Original secret video is recovered from the transmitted video nearly losslessly using a secret key.**

Index Terms—**Descrambling, image frames, mosaic video, scrambling,**

I. Introduction

Confidential videos used in the fields like military, medical etc should be protected from leakage during transmission via internet. Many methods of data hiding and encryption were proposed earlier. Data hiding is the process of hiding the secret data in the cover image [9][10]. But in this method embedding the large secret image into cover image with the same size is a difficult process that is the secret data should be highly compressed before embedding .while recovering the secret data there will be loss of data. Similarly the encrypted image [5] is actually a noisy image. Attackers can easily notice it .and also it does not provide the additional information before decryption. In this paper a new type of computer art known as secret fragment visible mosaic image is used for the transmission of image frames [1].Here the transformation of secret image into mosaic image is taking place. The transformation process is controlled by a secret key. The mosaic image is looking similar to the target image and the size is also similar to the target image. Here the user is allowed to select the target image freely. A scrambler is a device that manipulates a data stream before transmitting. The manipulations are reversed by a descrambler at the receiving side. A scrambler replaces sequences (referred to as whitening sequences) into other sequences without removing undesirable sequences, and as a result it changes the probability of occurrence of vexatious sequences.

In this paper the technique of mosaic image creation and audio scrambling is combined for efficient transmission of the secret video. Here we are splitting the secret and target videos into image frames and the audio. Then performing the mosaic image creation method in each frames and the audio of the secret data only is scrambled .Then transmitting the combined mosaic video. At the receiver section we can make use of the embedded key to recover the original image frame. Here again splitting the mosaic video into frames and audio. The audio is descrambled to get the original audio signals. Inverse mosaic transformation is performed to get the secret video.

The rest of the paper is organized as follows: Section II describes the mosaic image formation [1] used in the proposed system. Section III describes extraction of secret image. Section IV describes methodology of the proposed method. Section V describes the result and discussion and the paper discussion is concluded in Section VI.

II. FORMATION OF MOSAIC IMAGE FRAMES REVIEW STAGE

The formation of mosaic image consists of several steps which is shown in the below flow diagram.

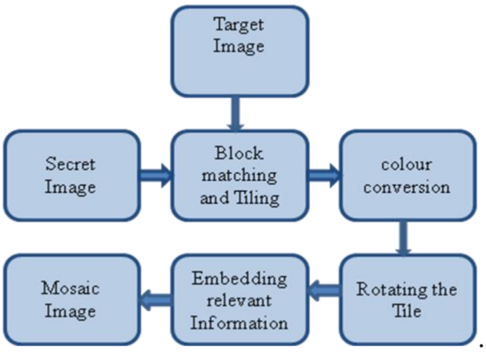

Fig. 1. Mosaic image creation diagram.

In this phase, a mosaic image is obtained. Observing such a type of mosaic image, one can see all the fragments of the source image, but the fragments are so tiny in size and so random in position that the observer cannot figure out what the source image looks like. Therefore, the source image may be said to be secretly embedded in the resulting mosaic images though the fragment pieces are all visible to the observer. And this is the reason why the resulting mosaic image is named secret-fragment-visible. The mosaic image 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 tile images of the secret image into the target blocks of a preselected target image; 2) transforming the color characteristic of each tile image in the secret image to become that of the corresponding target block in the target image; 3) rotating each tile image into a direction with the minimum RMSE value with respect to its corresponding target block; and 4) embedding relevant information into the created mosaic image for future recovery of the secret image. For embedding the secret key and related information LSB

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Substitution method is used. Corresponding mosaic image obtained is shown in the below fig.2

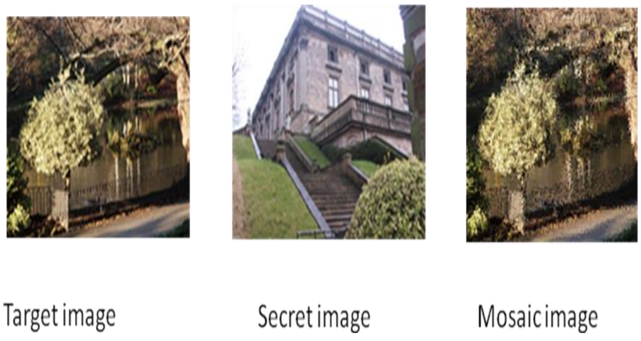

Fig. 2. Mosaic image obtained

III. EXTRACTION OF SECRET IMAGE

The recovery process of the secret image consists of the inverse of mosaic transformation as shown in fig.3

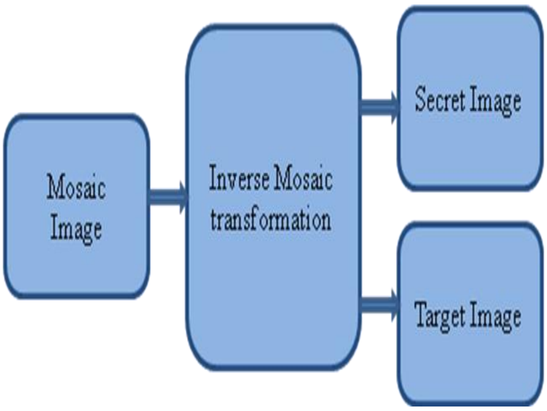

Fig. 3. Secret image extraction diagram.

In the recovery process we are extracting the image recovery bit stream from mosaic image and decode them to obtain the embedded data items. Then recovering the secret image using the extracted information.

IV. PROPOSED METHOD

This paper describes enhanced method of video transmission. This can be used in various applications like medical fields, personal video transmission , military application ,commercial enterprises etc. to transmit their confidential videos over internet.

A. MOSAIC VIDEO GENERATION

This technique combines the process of mosaic image transmission and audio scrambling. Here we can select the target video freely, that is there is no need of database. The following fig.4 shows the different phases of producing the mosaic video.

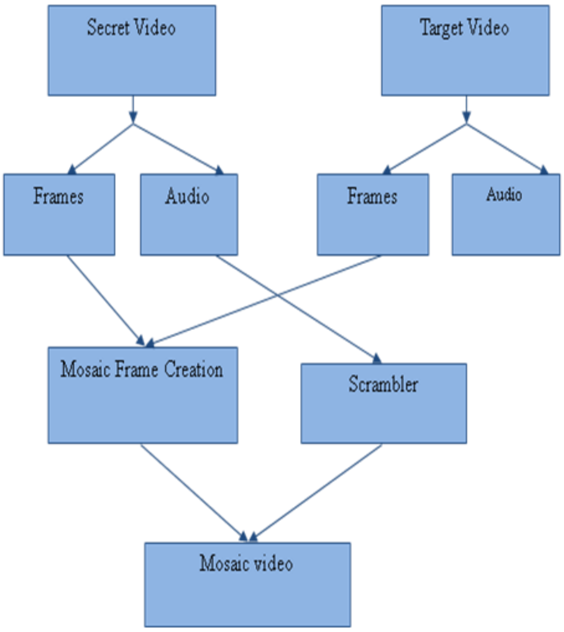

Fig. 4. Mosaic video creation of the proposed method.

The First step in this process is to select the secret video and the target video. After selecting the videos splitting the secret video into corresponding image frames and audio .similarly we are separating the target video into image frames and audio. The target audio is not used. Only the target image is used in the entire phase of the mosaic video creation. Next stage is the mosaic image frame creation. For that we are taking the frames of the target video and secret video .then performing the secret image creation step discussed in the previous paper by Ya-Lin Lee[11]. After a target image is selected arbitrarily, the given secret image is first divided into rectangular fragments called tile images, which then are fit into similar blocks in the target image, called target blocks, according to a similarity criterion based on color variations. Next, the color characteristic of each tile image is transformed to be that of the corresponding target block in the target image, resulting in a mosaic image which looks like the target image. In order to enhance the color similarity between the tile images and target blocks rotating the tile image into one of the four directions,0°,90°,180°,and 270°. Thereby we can reduce the RMS value with respect to target block. The relevant information and the secret key required for the exact recovery of secret image is embedded in the mosaic image using the LSB substitution method. This process is repeated for the entire frames. The audio which is separated from the secret video is scrambled .Finally the scrambled audio and the entire mosaic image frames are combined to produce the Mosaic video. This video is looking like the target video with scrambled audio. This can be safely transmitted through the internet.

B. SECRET VIDEO RECOVERY

Secret video can be recovered from the Mosaic video nearly losslessly. The fig.5 describes the various stages in the recovery process.

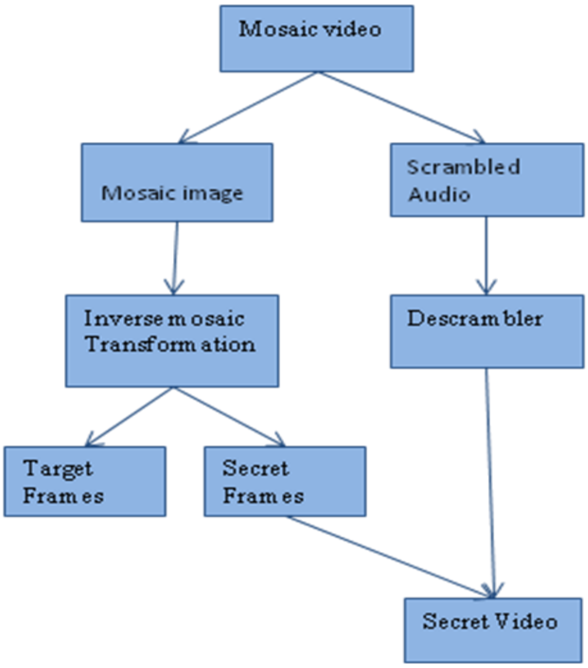

Fig. 5. Secret video recovery in the proposed method.

Initially from the mosaic video, we are splitting the mosaic image frames and the scrambled audio. The performing the inverse of the operation performed in the mosaic image creation in each frames. This operation is performed with the help of the secret key. Extracting the embedded information. That is decoding the embedded bit stream to obtain the relevant information. Then recovering the secret image. That is rotating the image in reverse direction, computing the original pixel values and then composing the all final tile image to form the desired secret image. This operation is performed on all image frames. Then the obtained secret frame is combined with the descrambled audio to recover the secret video.

V. RESULT AND DISCUSSION

The proposed method of Mosaic video transmission and Secret video recovery can be implemented using MATLAB and we can obtain an efficient method for video transmission. The main advantages of this method are 1) user is allowed to select his favorite video as target video; 2) Error due to compression is avoided; and 3) less noisy. The main disadvantage is that the execution time is more. So in future we can develop new methods for reducing execution time.

VI. CONCLUSION

In this paper, a secure method of transmitting video is proposed. Videos can be transmitted in an efficient way through internet by protecting from leakage. A meaning full mosaic video is created. The mosaic video created is looking similar to the target video. The original secret video can be recovered nearly losslessly from the mosaic video using the secret key.

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