Cassette Steganography for Entrenched Metaphors in Squashed Videos

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Abstract: Image embedding is the process of embedding image in a data source without changing its perceptual quality. A new technique is proposed for image embedding and extraction for high resolution compressed videos. In this method instead of changing the LSB of the cover file, the LSN bits are changed in alternate bytes of the cover file. The secret image is encrypted by using the gray-scale image and the half-toning technique was introduced before the actual embedding process starts. The Cover image does not affect the physical properties of the image such as contrast, pixel expansion and colors. An index can also be created for the secret image and the index is placed in a frame of the video itself. With the help of this index, we can easily extract the secret image, which can reduce the extraction time.

Key words: Gray-scale image • Half-toning technique • LSN bits

INTRODUCTION

In network technology, multimedia information is transmitted over the Internet conveniently. Various confidential data such as military maps and commercial identifications are transmitted over the Internet [1-3] t. While using secret images, security issues should be taken into consideration because hackers may utilize weak link over communication network to steal information that they want. To deal with the security problems of secret images, various image secret sharing schemes have been developed [4-6].

STEGANOGRAPHY is the mechanisms of hiding data like secret messages into any kind of files such as document, image, video, etc. The message can be text, audio, picture or video depending on the size of the message. Steganography mechanism is an important thing for message passing in military and bank purposes. Steganography and the cryptography mechanisms are combined together to send a secret data with full security. The best steganographic method that works in this domain is the LSN (Least Significant Nibble), which replaces the least significant nibbles of pixels selected to hide the information [7-9].

Early video steganography technique is extended to be in a video format by hiding the message in each frame as independently by using LSB (Least Significant Bits). Such methods are used with the basic idea of transforming the data is generally preferred for hiding data [10-12].

Video-image Conversion: A video encoded according to a video compression format is normally bundled with an audio stream (encoded using an audio compression format) inside a multimedia container format such as AVI, MP4, FLV, RealMedia, or Matroska.

Video to image conversion is the process of transferring a video to cinematic motion picture. The number of still pictures per unit of time can be separated from the video. 120 or more frames per second of images can be retrieved from new professional cameras.
Video is the Group Of Pictures (GOP). GOP is selected in order to deal with the gray-scale image, the half-toning technique was introduced into the visual cryptography. The half-toning technique (or dithering technique) is used to convert the gray-scale image into the binary image [12].

Many kinds of halftone algorithms have been proposed in the literature. In this paper, we make use of the patterning dithering. The patterning dithering makes use of a certain percentage of black and white pixels, often called patterns, to achieve a sense of gray scale in the overall point of view. The pattern consists of black and white pixels, where different percentages of the black pixels stand for the different grayness’s [15].

The half-toning process is to map the gray-scale pixels from the original image into the patterns with certain percentage of black pixels. The half-toned image is a binary image. However, in order to store the binary images one needs a large amount of memory. A more efficient way is by using the dithering matrix and LSN schemes [16].

The dithering matrix is a C x D integer matrix, denoted as D. The entries, denoted as Dij for and dithering matrix are integers between 0 and CD-1, which stand for the gray-levels in the dithering matrix. Denote as the gray-levels of a pixel in the original image [17].

Gray Scale Image:

```
| INPUT | Original image I that to be sent. |
| OUTPUT | Gray scale image g which contains black. |
```

Here, we are handling two types of Images

- Color Image
  - Browse from the system.

- Text-based Image
  - Enter some text information and save as Image.
  - Then convert the color image to Gray scale image.
  - Colors in an image may be converted to a shade of gray by calculating the effective brightness or luminance of the color and using this value to create a shade of gray that matches the desired brightness.

Half-Toning Technique:

```
Input: The C x D dithering matrix D and a pixel with gray-level in input image I.
Output: The half-toned pattern at the position of the pixel 

For i=0 to C-1 do
  For j=0 to D-1 do
    If g = Dij then print a black pixel at position (i,j).
```

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Embedding Image:

```
Input: Separated share image With dithering Matrix.
Output: Cover image that contains part of the Share with dithering matrix.
```

We generate the covering shares for an access structure. We take gray-scale original share images, as the inputs and output binary meaningful shares, where the stacking results of the qualified shares are all black images, i.e., the information of the original share images are all covered.

We call the output meaningful shares the covering shares in the rest of this paper. The covering shares have the advantage that, when the qualified subsets are stacked, all the information of the patterns in the original share images is covered. Hence the visual quality of the recovered secret image is not affected [18].

**Step 1:** Dividing the covering shares into blocks that contain sub-pixels each.

**Step 2:** Choose embedding positions in each block in the covering shares.
Step 3: For each black (respectively, white) pixel in, randomly choose a share matrix (respectively).

Step 4: Embed the sub pixels of each row of the share matrix into the LSN bits of embedding positions chosen in Step 2.

Recover Image:

<table>
<thead>
<tr>
<th>INPUT</th>
<th>Embedded cover image with part of share.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT</td>
<td>Extracting the part of the shares from the cover image and merging the shares to obtain the original image</td>
</tr>
</tbody>
</table>

Here we have to recover the original image by merging the shares by following steps,

Step 1: Concatenate starting dithering matrices with entries and divide these starting dithering matrices into blocks.

Step 2: Choose the embedding positions in each block.

Step 3: Concatenate the blocks and divide them into dithering matrices.

Step 4: For each dithering matrix, remove the embedding positions form LSN and the rest of the positions in each dithering matrix constitute the universal set for this dithering matrix.

Step 5: Generate the dithering matrixes according to Construction [19-24].

First we compare the shares with a matrix that belongs to the shares. If the pixels of share have affected by the cover image means we have to take the values from the Dithering matrix and insert in to the LSN of Shares. Then merge the shares to recover original Image.

CONCLUSION

The proposed construction of video steganography was realized by embedding the secret image into the meaningful cover image of a compressed video file using LSN schemes. And the stacking of a qualified subset of cover files will recover the secret image visually. We show two methods to generate the covering shares and proved the optimality on the black ratio of the threshold covering subsets. We also proposed a method to improve the visual quality of the share images. The proposed embedded video steganography has many specific advantages against different well-known schemes, such as the fact that it can deal with gray-scale input images, has smaller pixel expansion, is always unconditionally secure, does not require complementary share images, one participant only needs to carry one share and can be applied for general access structure.

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