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Hiding an Image in Its Small Segment by Mixing the Segments

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Abstract*: - *Blending mechanism and segmentation procedures are used for the hiding process. By blending the segments of an image forms a single segment. The whole image is hiding in this single segment. The proposed work attempted to split an image into eight segments and mixing the segments by performing arithmetic operations between the segments. The original image is hiding in the one of eight segment of the image. By the reverse process, the original image can be extracted.

Keywords: - ***color image, image hiding, segmentation, segment blending, arithmetic operations***

I. INTRODUCTION

Information is essential for any association or a person. So should keep the information confidentially and safely at the time of storing and transmission too. Information can be anything like text data, image data, videos, audios, etc. This paper proposes a new mechanism for hiding an image safely.Hiding images are a very challenging task. For hiding images, the image should make more complex. The important thing is that when making images more complex it should be reversible to the original image. That is, do not loss bits or quality in the image. The proposed work makes the image more difficult to identify and also extracting the original image by the reverse process.

II. RELATED WORK

Steganography by use Binary Operation [1]
A text hiding in a cover image

- Convert each letter of the text into Ascii values then to binary values
- Add each bit of this binary values to the LSB of each pixel values of the cover image using binary addition
- Example:

A=6
=1000001

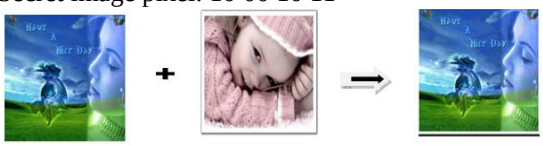
- each pixel contains three parts: red value, blue value, green value

	R	G	B
first pixel	10000001.	11100011.	11110001.
2nd pixel	10001101.	11111000.	11111001.
3rd pixel	10001110.	11111100.	11110011.

- To accommodate one letter of a text a cover image requires two pixels and two colors
  A Steganography Technique for Hiding Image in an Image using LSB Method for 24 Bit Color Image [2]
- Hiding an image into a cover image by using improved LSB (least significant bit) replacement method for 24-bit color Image
- Consider a cover image. LSBs of the pixel values of the cover image are replacing with the MSBs of pixel values of the secret image

R- 10000001 → 10000010
G- 10101101 → 10101100
B- 10101101 → 10101111

Secret image pixel: 10 00 10 11



Cover image secret image stego image

III. PROPOSED APPROACH

The image hiding process is a very challenging task. We can see that in all existing systems a cover image is used to hide a secret image. But in proposed work, an image is hiding in its segment. No cover images are used for hiding an image. Both segmentation and blending mechanisms are used for hiding image. The blending process makes the image more complex. Segmentation process divides the image into multiple segments. In the proposed work, eight segments of the image are considering for the mixing process.

A. Working Principle

1) Take a color image.
2) Split the image into four segments
3) Combine four segments by performing arithmetic operations between the segments
4) Then divide the blended segment that is resulting from step 3 into four segments
5) Combine segments formed from step 4
6) The image resulting from step 5 is the final hidden image. That is, the original image hides in the small segment of that image. By mixing segments, the data in the input image is unmistakable in the blended segment
Mixing of two segments by performing the arithmetic minus operation as follows:

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A	-	B	=	+/- C	abs(C)
A11 A12		B11 B12		C11 C12	C11 C12
A21 A23		B21 B22		C21 C23	C21 C22

'A' and 'B' are two segments of the image. Mix A and B by performing the arithmetic minus operation between the pixel values of A and B. the result of A-B may contain positive or negative values. So take absolute values of the result and take it as a blended segment.

For the reverse process, a key is used to recover the minus values at C. the key is generated using values in +/-C. from here, replace all positive values with zeroes, and then take absolute values of negative values. And keep these values as key. At the time of the reverse process, this key value is subtracted two times from the blended segment.

IV. RESULTS

The outcomes showed beneath are uses of the proposed methodology to hide the image.

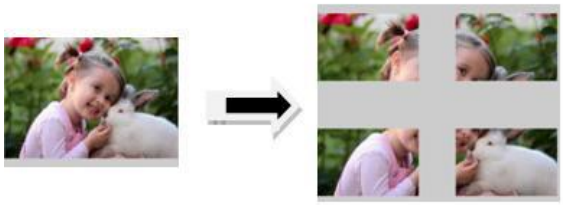


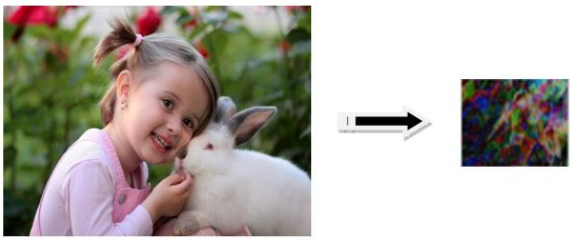
Fig 1: input image divide into four segments

Fig 2: combining four segments

Fig 3: dividing blended segment into four segments

Fig 4: combining four segments to form final output

The results show that the image is hiding in a segment of that image. Fig 1 shows the segmentation of the original image. Fig 2 shows the blending process of these segments. In Fig 3 the blended segment is again dividing into four segments. Then, combine these segments to form a final output image. The original image is hiding in the final output image.



Original image hidden image

V. CONCLUSION

In this paper, a new technique is proposed for hiding the color image. The mixing procedure conceals the significance of the input image. The work can be associated with keep classification on image data and to protect image during transmission as well. The strategy is tried for taking eight segments however can be reached out to a huge number of segments for mixing. Thus the guideline subject of covering image is viably realized.

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