AN EFFICIENT DATA ENCRYPTION MECHANISM BY USING OPTIMAL LSB TECHNIQUE

Sk.Thameem Ansari [1],K.Chaitanya[2],N.BalaKrishna[3],Dr.S.Siva Nageswara Rao[4]

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nsaivenkatabalakrishna@gmail.com, drssnr@rediffmail.com[4].

ABSTARCT:

Steganography technique is used to hide data in an original medium without any visible alterations, making it undetectable to unauthorized parties. One of the most popular steganography techniques is the Least Significant Bit (LSB), which involves substituting certain parts of the cover photo with hidden information. However, the current approach of LSB substitution suffers from a decrease in steganographic image quality as the steganographic image capacity increases. To overcome this limitation, a proposed approach aims to increase the capacity while maintaining outstanding visual quality.

KEYWORDS: **Related words include LSB, steganography, information concealment, image manipulation, and information security.**

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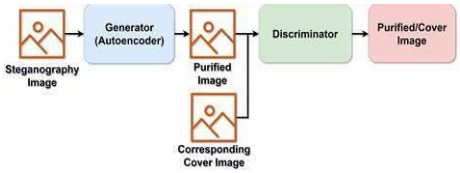

Fig 1(a) Architecture of Image Steganography

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3.1 The Ideal LSBs Mechanism:

To increase how well the stego picture is produced, numerous enhancement strategies based on LSBs method are suggested [17–19]. This section explains the optimum LSBs technique [20], one of the improved methods. It employs the best pixel correction method to enhance the stego image quality (OPAP). The embedding algorithm's steps are as follows:

- *Assume that Gi is the value of the ith pixel in the cover picture, and 'n' is the number of the secret data bit(s) to be inserted.• To obtain the stego pixel Gi, use the LSBs approach to embed t bit(s) into Gi.*
- *Gi's (n + 1)th bit has to be changed to provide the two extra pixel values G and G+, which can be roughly expressed as G = Gi + 2n G, G + (1), and G = Gi + 2n.*

Gi, G+, and G all contain the same embedded data since they all share the same final n bits.

- *Use following formula to determine the Gi (optimal candidate) value that is closest to the original pixel value:(2), if Gi G+ • At last, switch all of the best candidates' pixel values to their original values.*

Let's say three secret data bits are 111, Gi is 10, and n is 3. Then, with the straightforward 3-LSBs procedure, the stego pixel Gi = 15 is generated. Changing the Gi's fourth bit will result in values of the two pixels. G+ = 23 and G = 7 are the values that are most similar to the pixels' original value. Gi=15, G+=23, and G is 7, all of which have the same last three bits, making 7 the best possibility for Gi.

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This section will discuss the suggested approach. As previously indicated, this approach relies on some arithmetic operations including LSB inversion. Instead of swapping out the Cover pixels' LSBs with hidden bits, their values are reversed. This improves the stego image's quality. To identify which bits are inverted, a flag is therefore needed [8, 11]. Hence, the maximum size for each quotient is 3 bits or 2 bits, respectively, with 3 bits [8] being the maximum amount for the remainder.The cover image has been divided into two equally sized pieces. The second portion is used to incorporate leftover data by flipping pixel LSBs.

Suppose I is any grayscale image and has the following pixel values: Q1, Q2,..., QN. Each pixel contains 8 bits:

Qi = a1,..., a8, |Qi| = 8 bits, and aj = 1, 0 for aj.

(3) O = G V is used to calculate the image size.

(4) where G and V stand for the height and breadth of the picture, respectively. Assume that N = n1, n2,..., nn, where ni 1, 0; and nn represent the length and secret data bits, respectively. (5) And the greatest hiding capacity in the image I is g, which is expressed in terms of bits as 1 g (N 8).

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Image steganography embedding algorithms are used to hide secret data

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The image steganography extracting algorithm is used to retrieve the hidden secret data from the steganographic image that was embedded using a steganography embedding algorithm.

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7.Reconstruct the secret data by combining the extracted least significant bits.

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Consider the next simple example to help further explain the suggested strategy: Suppose that the original pixel counts for the first and second halves of the cover image are 200 and 170, respectively. The secret data has values of [250, 123, 125], where 250 is the highest number and 123 is the lowest value

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R has a value of 127

- As 250 may be divided by 125 to yield 125, A, B, and C have values of 3 and 5, respectively.

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Moreover, when A = 3, the third and fourth LSBs of this pixel are inverted.• The first part's stego pixel will have a value of 197. this value following a

second reversion of the second LSB and use of the best LSBs technique.

- If C = 5, the first and third LSBs of the original pixel should be inverted in the second component. • The value of C is 5, and the second component inverts the first and third LSBs of the original pixel.
- Upend the fourth LSB of this pixel to demonstrate that the second LSB is once more upended in the pixel in the first portion.
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4.RESULT ANALYSIS:

Here the result is came from the comparision of LSB technique and optimal LSB technique. Optimal LSB algorithm is having high graph compared to simple LSB technique. The peak signal to noise ratio (PSNR), expressed in decibels, between two pictures is computed. The quality of the compressed image improves with increasingPSNR.

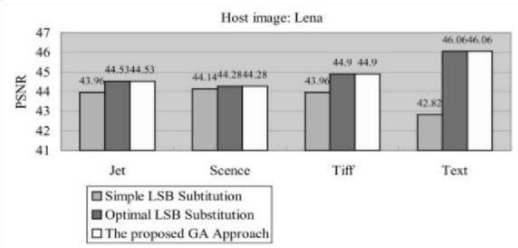

Fig 4(a)Comparison of Simple LSB and Optimal LSB

Fig 3.3.3.3 Experimental Results for images with size 225 × 225

5.OUTPUT SCREENS:

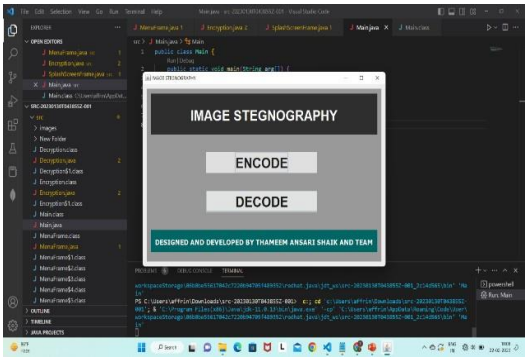

Fig 5(a) Output of Main Window

- Lastly, the first and second parts of the cover image's stego pixels are 197 and 167, respectively.

Cover images	*R*≤127		*R*>127	
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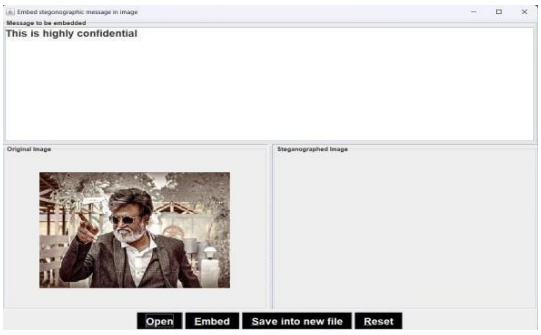

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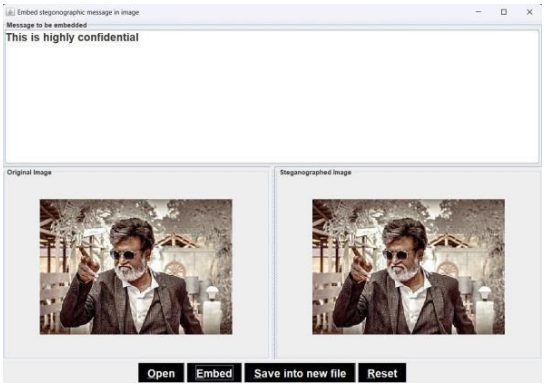

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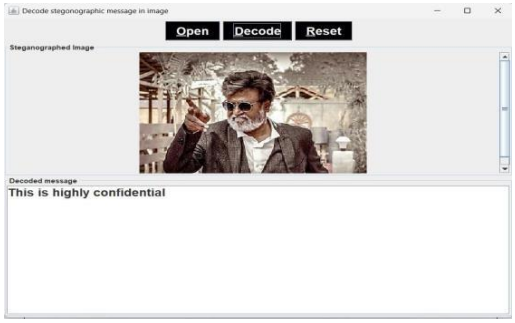

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by Shaik Thameem Ansari

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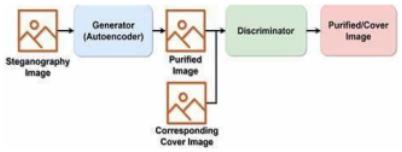

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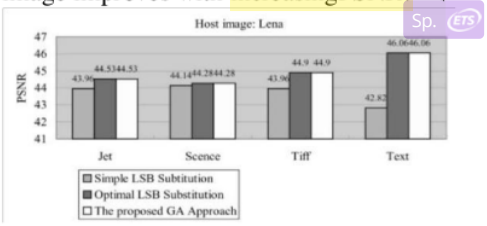

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Fig 3.3.3.3 Experimental Results for images with size 225 × 225

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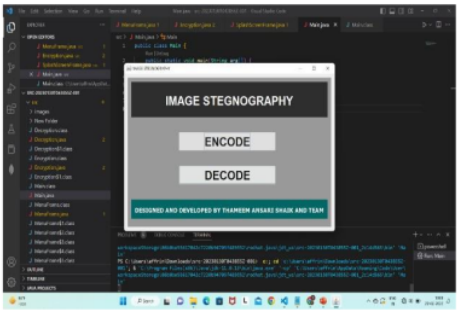

Fig 5(a) Output of Main Window

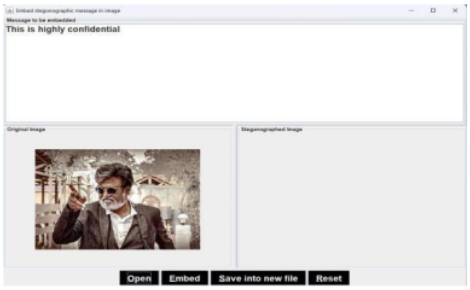

Fig 5(b) Select Target Image

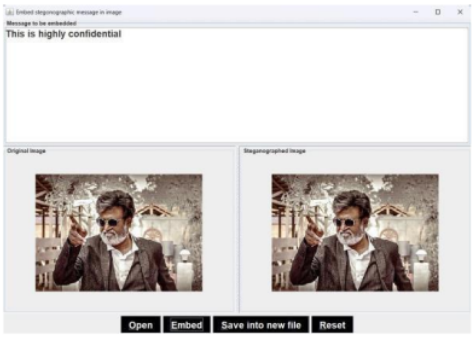

Fig 5(c) Embed Image

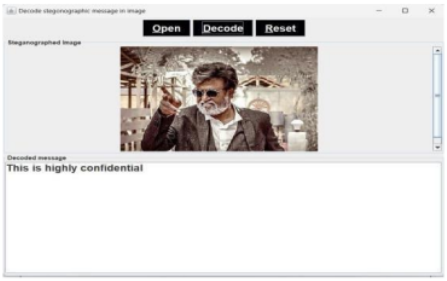

Fig 5(d) Final Decrypted Output

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PAGE 2

Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

Article Error You may need to use an article before this word. Consider using the article **a**.

Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

Article Error You may need to remove this article.

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S/V This subject and verb may not agree. Proofread the sentence to make sure the subject agrees with the verb.

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Possessive

Prep. You may be using the wrong preposition.

Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.

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Verb This verb may be incorrect. Proofread the sentence to make sure you have used the correct form of the verb.

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Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.

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Possessive