Impact Factor (SJIF): 4.542

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444
Volume 4, Issue 4, April -2017

IMAGE STEGANOGRAPHY USING 4LSB

Nikhil Gajengi[1], Pankaj Dalvi[2], Abhishek Bhandalkar[3], Atul Kekan[4] Prof. Manisha Bharti[5]

[1]Department of Computer Engineering, Indira College Of Engineering And Management Pune, Maharashtra, India
[2]Department of Computer Engineering, Indira College Of Engineering And Management Pune, Maharashtra, India
[3]Department of Computer Engineering, Indira College Of Engineering And Management Pune, Maharashtra, India
[4]Department of Computer Engineering, Indira College Of Engineering And Management Pune, Maharashtra, India
[5]Department of Computer Engineering, Indira College Of Engineering And Management Pune, Maharashtra, India

Abstract — ***This technology proposes a lossless, a reversible, and a combined knowledge concealing schemes for ciphertext pictures encrypted by public key cryptosystems with probabilistic and holomorphic properties. Within the lossless theme, the ciphertext pixels square measure replaced with new values to insert the extra knowledge into many LSB-planes of ciphertext pixels by multiple layer wet paper secret writing. Then, the embedded knowledge is directly extracted from the encrypted domain and also the knowledge embedding operation doesn't have an effect on the cryptography of original plaintext image. Within the reversible theme, a pre-processing is developed to contract the image bar chart before image cryptography, so the modification on encrypted pictures for knowledge embedding won't cause any constituent oversaturation in plaintext domain. Though a small distortion is introduced, the embedded knowledge is extracted and also the original image is recovered from the directly decrypted image. As a result of the compatibility between the lossless and reversible schemes, the info embedding operations within the 2 manners is at the same time executed in associate degree encoded image. With the combined technique, a receiver could extract a region of embedded knowledge before cryptography, and extract another part of embedded knowledge and recover the initial plaintext image when cryptography.***

Keywords- Reversible Data Hiding, Lossless Data Hiding, Image Encryption.

I. INTRODUCTION

Encryption and information hiding are two viable methods for information security. While the encryption procedures change over plaintext content into mixed up ciphertext, the information concealing strategies insert extra information into spread media by presenting slight alterations. In some mutilation unsuitable situations, information concealing may be performed with a lossless or reversible way. In spite of the fact that the expressions "lossless" and "reversible" have a same which means in an arrangement of past references, we would recognize them in this work.

We say that information hiding technique is lossless if the display of cover signal containing installed information is same as that of unique cover despite the fact that the spread information have been adjusted for information inserting. For instance, the pixels with the most utilized shading as a part of a palette picture are doled out to some unused shading lists for conveying the extra information, and these files are diverted to the most utilized shading. Thusly, despite the fact that the files of these pixels are modified, the genuine shades of the pixels are kept unaltered. Then again, we say an information concealing system is reversible if the first cover substance can be consummately recouped from the spread rendition containing installed information despite the fact that a slight bending has been presented in information implanting strategy. Various instruments, for example, distinction extension, histogram shift and lossless pressure, have been utilized to build up the reversible information concealing systems for computerized pictures. As of late, a few decent forecast methodologies and ideal move likelihood under payload-mutilation measure have been acquainted with enhance the execution of reversible information covering up.

II. LITERATURE REVIEW

1]Title : High Capacity Lossless Data Embedding Technique for Palette Images Based on Histogram Analysis
Authors: N. A. Saleh, H. N. Boghdad.

Recently data embedding over images has drawn tremendous interest, using either lossy or lossless techniques. Although lossy techniques can allow large hiding capacity, host image cannot be recovered with high fidelity. Some applications require exact recovery of the host image, i.e. In medicine patient data can be embedded without affecting the medical image. In general lossless data hiding techniques suffer from limited capacity as the host image should be kept intact. In this paper a lossless embedding technique is proposed. In this technique image histograms are analysed to identify the embedding capacity of different image types. Histogram maxima and minima are used in embedding capacity estimation.

The proposed technique gives hiding capacity that can reach up to 50% of the host image size for images with large homochromatic regions (cartoons-like)

2]Title: Reversible Data Embedding Using a Difference Expansion
Authors: M. Bellare, S. Keelveedhi, and T. Ristenpart
Current difference-expansion (DE) embedding techniques perform one layer embedding in a difference image. They do not turn to the next difference image for another layer embedding unless the current difference image has no expandable differences left. The obvious disadvantage of these techniques is that image quality may have been severely degraded even before the later layer embedding begins because the previous layer embedding has used up all expandable differences, including those with large magnitude. Based on integer Haar wavelet transform, we propose a new DE embedding algorithm, which utilizes the horizontal as well as vertical difference images for data hiding. We introduce a dynamical expandable difference search and selection mechanism. This mechanism gives even chances to small differences in two difference images and effectively avoids the situation that the largest differences in the first difference image are used up while there is almost no chance to embed in small differences of the second difference image.

3]Title: Reversible Data Hiding
Authors: Ni, Y.-Q. Shi
The objective of this work is to automatically generate a large number of images for a specified object class (for example, penguin). A multi-modal approach employing both text, meta data and visual features is used to gather many, high-quality images from the web Candidate images are obtained by a text based web search querying on the object identifier (the word penguin).The web pages and the images they contain are downloaded. The task is then to remove irrelevant images and re-rank the remainder. First, the images are re-ranked using a Bayes posterior estimator trained on the text surrounding the image and metadata features (such as the image alternative tag, image title tag, and image filename). No visual information is used at this stage. Second, the top-rank damages are used as (noisy) training data and a SVM visual classifier is learnt to improve the ranking further. The principal novelty is in combining text/meta-data and visual features in order to achieve a completely automatic ranking of the images.

4] Lossless Generalized-LSB Data Embedding
Authors: M. U. Celik, G. Sharma
We present a novel lossless (reversible) data-embedding technique, which enables the exact recovery of the original host signal upon extraction of the embedded information. A generalization of the well-known least significant bit (LSB) modification is proposed as the data-embedding method, which introduces additional operating points on the capacity-distortion curve. Lossless recovery of the original is achieved by compressing portions of the signal that are susceptible to embedding distortion and transmitting these compressed descriptions as a part of the embedded payload. A prediction-based conditional entropy coder which utilizes unaltered portions of the host signal as side-information improves the compression efficiency and, thus, the lossless data-embedding capacity.

5] Minimum Rate Prediction and Optimized Histograms Modification for Reversible Data Hiding
Authors: X. Hu, W. Zhang, X. Li.
We propose to shift the goal of recognition from naming to describing. Doing so allows us not only to name familiar objects, but also: to report unusual aspects of a familiar object (“spotty dog”, not just “dog”); to say something about unfamiliar objects (“hairy and four-legged”, not just “unknown”); and to learn how to recognize new objects with few or no visual examples. Rather than focusing on identity assignment, we make inferring attributes the core problem of recognition. These attributes can be semantic(“spotty”) or discriminative (“dogs have it but sheep don’t”). Learning attributes presents a major new challenge: generalization across object categories, not just across instances within a category. In this paper, we also introduce a novel feature selection method for learning attributes that generalize well across categories. We support our claims by thorough evaluation that provides insights into the limitations of the standard recognition paradigm.

III. EXISTING SYSTEM

- Encryption and data hiding are two effective means of data protection. While the encryption techniques convert plaintext content into unreadable cipher text, the data hiding techniques embed additional data into cover media by introducing slight modifications.
- In some distortion-unacceptable scenarios, data hiding may be performed with a lossless or reversible manner.
- Although the terms “lossless” and “reversible” have a same meaning in a set of previous references, we would distinguish them in this work

Disadvantages of Existing System:

- Third user can easily identify the data where is encrypted.
- Once we perform encryption on image the size of image is also increases.

IV. 4 LSB TECHNIQUE

The LSB of a byte is replaced with an M's bit. This technique works good for image steganography. The Least Significant Bit (LSB) is one of the main techniques in spatial domain image steganography. In this work, a new technique of LSB steganography has been proposed which is an improvised version of one bit LSB technique.

The LSB is the lowest significant bit in the byte value of the image pixel.

The LSB based image steganography embeds the secret in the least significant bits of pixel values of the cover image (CVR).

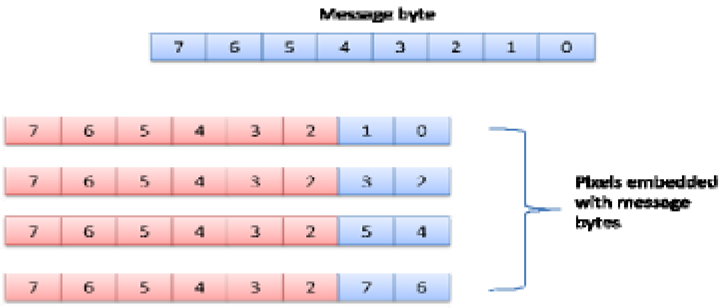

Figure 1: Proposed 4LSB Algorithm

In conventional LSB technique, which requires eight bytes of pixels to store 1byte of secret data but in proposed LSB technique, just four bytes of pixels are sufficient to hold one message byte. Rest of the bits in the pixels remains the same.

LSB algorithm hide information in the least significant bit of each color i.e. RGB of the carrier image. The problem states from the fact that modifying the three colors of a pixel produces a major distortion in the resulting color. So the one method that would introduce more efficiency and less distortion is Enhanced Least Significant Bit. Enhanced LSB algorithm works in the spatial domain. It improves performance of LSB by hiding information in only one of the three colors that is blue color of the carrier image.

Algorithm

1. Select a cover image of size M*N as an input.
2. The message to be hidden is embedded in Blue component only of an image.
3. Use a pixel selection filter to obtain the best areas to hide information in the cover image to obtain a better rate. The filter is applied to Enhanced Least Significant Bit (ELSB) of every pixel to hide information, leaving most significant bits (MSB).
4. After that Message is hidden using Bit Replacement method.

V. PROPOSED SYSTEM

We say a data hiding method is reversible if the original cover content can be perfectly recovered from the cover version containing embedded data even though a slight distortion has been introduced in data embedding procedure. A number of mechanisms, such as difference expansion, histogram shift and lossless compression, have been employed to develop the reversible data hiding techniques for digital images. Recently, several good prediction approaches and optimal transition probability under payload-distortion criterion have been introduced to improve the performance of reversible data hiding.

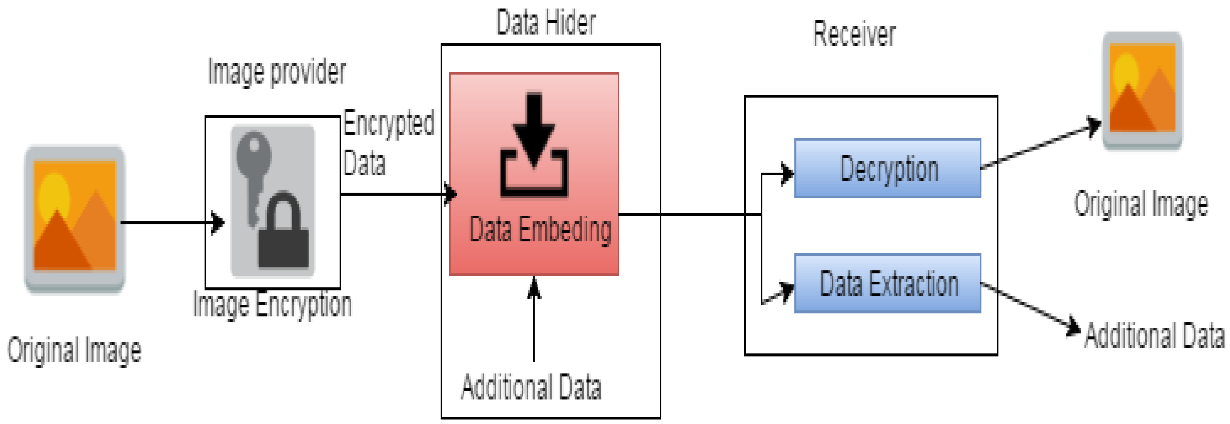

Fig.1 Architecture of proposed System

Advantages of Proposed System:

- We can perform comp ration as well as data encryption back side of image.
- We can easily hide the large amount of data background of image.

VI. CONCLUSION

This work proposes a lossless, a reversible, and a combined information hiding devices for figure content pictures scrambled by open key cryptography with probabilistic and homomorphic goods. In the lossless plan, the ciphertext pixel abilities are replaced with new values for installing the extra information into the LSB-planes of ciphertext pixels. Thusly, the installed information can be openly removed from the scrambled area, and the information planting operation does not influence the unscrambling of unique plaintext picture. In the reversible plan, a pre-processing of histogram therapist is made before encryption, and a half of ciphertext pixel abilities are altered for information inserting. On beneficiary side, the extra information can be separated from the plaintext space, and, in spite of the fact that a slight twisting is presented in ordered picture, the first plaintext picture can be improved with no mistake. Because of the two's similarity plots, the information implanting tasks of the lossless and the reversible plans can be all the while performed in a scrambled picture. In this way, the collector may remove a piece of installed information in the scrambled space, and focus another section of inserted information and retrieve the first plaintext picture in the plaintext area.

ACKNOWLEDGMENT

Authors want to acknowledge Principal, Head of department and guide of their project for all the support and help rendered. To express profound feeling of appreciation to their regarded guardians for giving the motivation required to the finishing of paper.

REFERENCES

[1] N. A. Saleh, H. N. Boghdad, S. I. Shaheen, A. M. Darwish, “High Capacity Lossless Data Embedding Technique for Palette Images Based on Histogram Analysis,” Digital Signal Processing, 20, pp. 1629–1636, 2010.
[2] J. Tian, “Reversible Data Embedding Using a Difference Expansion,” IEEE Trans. On Circuits and Systems for Video Technology, 13(8), pp. 890–896, 2003.
[3] Z. Ni, Y.-Q. Shi, N. Ansari, and W. Su, “Reversible Data Hiding,” IEEE Trans. On Circuits and Systems for Video Technology, 16(3), pp. 354–362, 2006.
[4] M. U. Celik, G. Sharma, A. M. Tekalp, and E. Saber, “Lossless Generalized-LSB Data Embedding,” IEEE Trans. On Image Processing, 14(2), pp. 253–266, 2005.
[5] X. Hu, W. Zhang, X. Li, and N. Yu, “Minimum Rate Prediction and Optimized Histograms Modification for Reversible Data Hiding,” IEEE Trans. On Information Forensics and Security, 10(3), pp. 653-664, 2015.
[6] X. Zhang, “Reversible Data Hiding with Optimal Value Transfer,” IEEE Trans. On Multimedia, 15(2), 316–325, 2013.
[7] W. Zhang, X. Hu, X. Li, and N. Yu, “Optimal Transition Probability of Reversible Data Hiding for General Distortion Metrics and Its Applications,” IEEE Trans. On Image Processing, 24(1), pp. 294-304, 2015.
[8] S. Lian, Z. Liu, Z. Ren, and H. Wang, “Commutative Encryption and Watermarking in Video Compression,” IEEE Trans. On Circuits and Systems for Video Technology, 17(6), pp. 774–778, 2007.

[9] M. Cancellaro, F. Battisti, M. Carli, G. Boato, F. G. B. Natale, and A. Neri, “A Commutative Digital Image Watermarking and Encryption Method in the Tree Structured Haar Transform Domain,” Signal Processing: Image Communication, 26(1), pp. 1−12, 2011.
[10] X. Zhang, “Commutative Reversible Data Hiding and Encryption,” Security and Communication Networks, 6, pp. 1396−1403, 2013.
[11] X. Zhang, “Reversible Data Hiding in Encrypted Image,” IEEE Signal Processing Letters, 18(4), pp. 255−258, 2011.
[12] W. Hong, T.-S. Chen, and H.-Y. Wu, “An Improved Reversible Data Hiding in Encrypted Images Using Side Match,” IEEE Signal Processing Letters, 19(4), pp. 199−202, 2012.
[13] J. Yu, G. Zhu, X. Li, and J. Yang, “An Improved Algorithm for Reversible Data Hiding in Encrypted Image,” Proceeding of the 11th International Workshop on Digital-Forensics Watermark (IWDW 2012), Shanghai, China, Oct. 31-Nov. 02, 2012, Lecture Notes in Computer Science, 7809, pp. 358-367, 2013.
[14] W. Puech, M. Chaumont, and O. Strauss, “A Reversible Data Hiding Method for Encrypted Images,” Security, Forensics, Steganography, and Watermarking of Multimedia Contents X, Proc. SPIE, 6819, 2008.
[15] X. Zhang, “Separable Reversible Data Hiding in Encrypted Image,” IEEE Trans. Information Forensics & Security, 7(2), pp. 526−532, 2012.