INTERNATIONAL JOURNAL OF SECURITY (IJS)

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EDITORIAL PREFACE

This is the *Second* Issue of Volume *Eight* of The International Journal of Security (IJS). The Journal is published bi-monthly, with papers being peer reviewed to high international standards. The International Journal of Security is not limited to a specific aspect of Security Science but it is devoted to the publication of high quality papers on all division of computer security in general. IJS intends to disseminate knowledge in the various disciplines of the computer security field from theoretical, practical and analytical research to physical implications and theoretical or quantitative discussion intended for academic and industrial progress. In order to position IJS as one of the good journal on Security Science, a group of highly valuable scholars are serving on the editorial board. The International Editorial Board ensures that significant developments in computer security from around the world are reflected in the Journal. Some important topics covers by journal are Access control and audit, Anonymity and pseudonym, Computer forensics, Denial of service, Network forensics etc.

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The coverage of the journal includes all new theoretical and experimental findings in the fields of computer security which enhance the knowledge of scientist, industrials, researchers and all those persons who are coupled with computer security field. IJS objective is to publish articles that are not only technically proficient but also contains information and ideas of fresh interest for International readership. IJS aims to handle submissions courteously and promptly. IJS objectives are to promote and extend the use of all methods in the principal disciplines of computer security.

IJS editors understand that how much it is important for authors and researchers to have their work published with a minimum delay after submission of their papers. They also strongly believe that the direct communication between the editors and authors are important for the welfare, quality and wellbeing of the Journal and its readers. Therefore, all activities from paper submission to paper publication are controlled through electronic systems that include electronic submission, editorial panel and review system that ensures rapid decision with least delays in the publication processes.

To build its international reputation, we are disseminating the publication information through Google Books, Google Scholar, Directory of Open Access Journals (DOAJ), Open J Gate, ScientificCommons, Docstoc and many more. Our International Editors are working on establishing ISI listing and a good impact factor for IJS. We would like to remind you that the success of our journal depends directly on the number of quality articles submitted for review. Accordingly, we would like to request your participation by submitting quality manuscripts for review and encouraging your colleagues to submit quality manuscripts for review. One of the great benefits we can provide to our prospective authors is the mentoring nature of our review process. IJS provides authors with high quality, helpful reviews that are shaped to assist authors in improving their manuscripts.

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Using SBR Algorithm To Hide The Data Into The JPEG Image

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Abstract

Data hiding is the art of hiding data for various purposes such as--- to maintain private data, secure confidential data. Well known technique is the Steganography; Steganography has evolved into a digital strategy of hiding a file in some form of multimedia, such as an image, an audio file or even a video file. This paper presents a new Steganography technique in spatial domain for encoding extra information in an image by making small modifications to its pixels. The proposed method focuses on one particular popular technique, Least Significant Bit (LSB) Embedding. Instead of using the LSB-1 of the cover for embedding the message, LSB-2 has been used to increase the robustness of system. and protect the message against the external influences such as noise, filter, compression…etc.[Using SBR Algo].

For more protection to the message bits a Stego-Key has been used to permute the message bits before embedding it. An experimental result of the modified method shows that this paper helps to successfully hide the secret data into the image file with minimum distortion made to the image file.

Keywords: Steganography, Data Hiding, Embedding Data, SBR Algo, Least Significant Bit.

1. INTRODUCTION

With the digitization of data and networking of communications, communications security over the Internet is becoming more and more crucial. With the growth in the communication and so is in the data transmission rate across the various medium it is utmost important to have secure transmission of confidential and proprietary information. Steganography is an art to hide a message within an object so that eavesdropper is unaware of the message presence. Steganography works by replacing bits of unused data bits of different, invisible information. This hidden information can be plain text, cipher text, or even images. Steganography can be applied on various digital objects like audio files, video files, images and text files. Digital images area preferred media for hiding information due to their high capacity and low impact on visibility. For the different image file formats, different steganographic algorithm exists. Most earliest is a Least Significant Bit Hiding (LSB) Scheme that is the easiest way of hiding information in an image. It uses LSB of the pixels to replace it with the message to be.

The basic terminologies used in Steganography systems are: the carrier, the secret data, and the stego key. The carriers such as a digital image, an mp3, even a TCP/IP packet among other things. Secret data is the information which is needed to be hidden in the suitable digital media. A stego key is used to decode the hidden message.

In history, the Nazis invented several Steganographic methods during WWII such as Microdots, invisible ink and null ciphers. As an example of the latter a message sent by a Nazi spy that read: "Apparently neutral's protest is thoroughly discounted and ignored. Isman hard hit. Blockade issue affects pretext for embargo on by-products, ejecting suet's and vegetable oils."

. Using the 2nd letter from each word the secret message reveals:

.Pershing sails from NY June 1.

In steganography, before the hiding process, sender must select an image file, secret data to be hidden and stego key used as password. This paper proposes a new second bit replacement algorithm to hide data in a JPEG image using steganographic method. In this we have used Compression method to increase the hiding capacity. We have used java application as front end And SQL query processor as back end for implementing this project.

2. IMAGE STEGANOGRAPHY
Image steganography takes the advantage of limited power of HVS.Images are the most popular object used for steganography.

2.1 Image Definition
Image is the collection of numbers that constitute different light intensities in different areas of image .This numeric representations forms a grid and the individual points are known as pixels .most images on the internet consists of rectangular map of images pixels, these pixels displayed R by R horizontally.

There are 8 bits used to define the color of each pixel. Digital color image is stored in 24 bit files & uses RGB color model as represents red[8 bit],green[8 bit],blue[8 bit].

2.2 Image Compression
When working with larger images, images tend to become too large to transmit over a std internet connection. To display an image in a reasonable amount of time ,techniques must be used to reduce the image's file size, these techniques use of mathematical formulas to analyze and condensed image data, resulting in smaller file size, this process is called compression.

2.3 Direct Cosine Transformation
Using DCT we can   hide data. The DCT algorithm is used extensively in video and image(JPEG).Most of the techniques uses JPEG image as vehicle to embed their data.JPEG compression uses DCT to transform successive sub image blocks[8 x 8] Pixels into 64 DCT coefficients. This is a very simple method and while it works well in
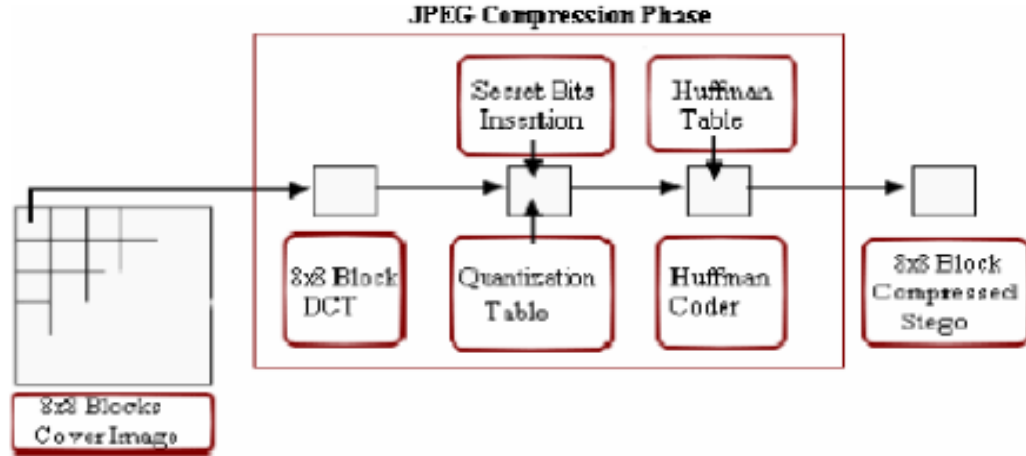
FIGURE1: Data flow diagram showing process of embeddingKeeping down distortions, it is vulnerabletonoise.

2.4. Categories of Image Steganography

Steganography can be applied to images, text, videos, digital signals as well as continuous signals and other information formats, but the preferred formats are those which repeat the data. Repetition can be in the form of repetition of bits which are responsible to visualize the information .Repeated bits of an object are those bits that can be altered without the alteration being detected easily.

Image domain also known as spatial domain methods insert messages in the intensity of the pixels directly. Image domain Steganography take in bit-wise methods that apply bit insertion and noise manipulation. Sometimes it is characterized as simple systems. Transform domain also known as frequency domain Steganography methods. In this method images are first transformed and then the message is inserted in the image

FIGURE2: Categories of Image Steganography.
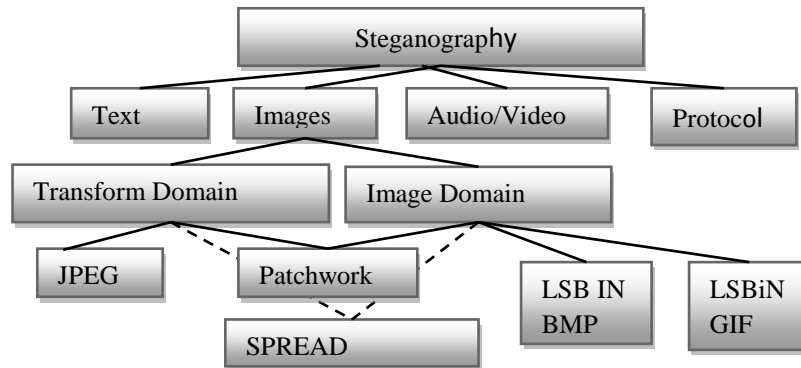
2.5 Applications of Steganography
1. Image Steganography allows for two parties to communicate secretly and covertly [on the internet].
2. It allows for copyright protection on digital files using the message as a digital watermark.
3. For the transportation of high-level or top-secret documents between international governments.
4. Remarkable use in Military Applications

5.   It can also be quite nefarious. It can be used by hackers to send viruses and Trojans to compromise machines, and also by terrorists and other organizations that rely on covert operations to communicate secretly and safely.

3. PROPOSED SYSTEM

I have chosen to implement LSB second bit replacement algorithm (SBR algorithm).

In this method, color image has been used as a cover. So, we can hide a data up to 65536 bytes. The data is embedded in the LSB-2 of the cover to increase the robustness of the system and protect the message against the external influences such as noise, filter, compression…etc. The embedding process is very easy, which only replaces the permutated bits of the message by the LSB-2 set of the cover to obtain the new stego-image array
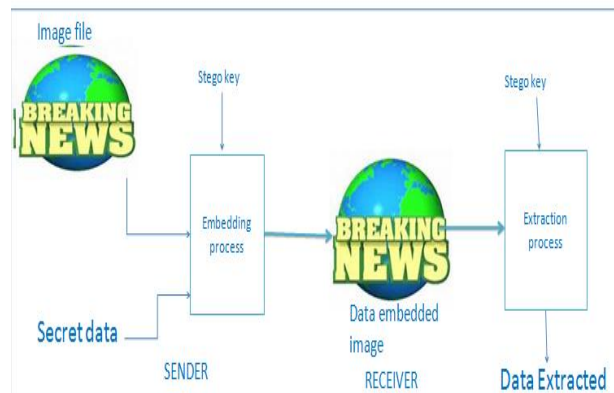

FIGURE 3: Proposed System.

The proposed system consists of :

3.1 Embedding Process
Inputs: Image file, secret data, stego key
Output: Data embedded image
Step 1: Scan the Original image and encode it in binary form and store it in the array called Pixel-array
Calls the compression function
Step 2: select secret data convert it in binary and store it in the array Mi.
Step3: select the image file and find number of pixels, set LSB-1=Ai array.
Step4: select the image file and find number of pixels, set LSB-2=Bi array.
Step 5: Encode Stego key in binary and store it in the array
Step 6: check the length of secret data and length of image file.
Step 7: Choose first pixel
Step 8: Start picking bit from the beginning of the key array, and LSB bit form first byte of pixel.
Step 9: Apply AND function& SHIFT operator.
Step 10: Start Loop1
        If bit of data to be hidden is=1& Bi = 0
          Then 1.replace value of Bi
                2. Ai=0
                3. Set as minus 1 pixel value
        End
Step 11: For second byte of image file
        Start Loop2
        If bit of data to be hidden is=0& Bi = 1
        Then 1.replace value of Bi

2. Ai=1
3. Set as increase 1 pixel value
End

Step12: Replace necessary bits as defined by Compression ratio in each pixel, Store information about bits Embedded in binary file.

Step13: Repeat step8, step9, step10, step11, step12 6 till all the bits of image file has been embedded.

Step 14: Set the image with new values and save it

Step 15: End

3.2. Extraction Process
Inputs: Embedded image file, Secret key
Output: Secret data
Step 1: Select the folder in which you want to extract the hidden data
Step 2: Choose the embedding image file.
Step 3: Provide security key.
Step4: Convert the binary file into human readable form.

4. EXPERIMENTAL RESULTS AND DISCUSSIONS
Experimental results are given in this section, we used standard image to apply the proposed algorithm, consider that we have to hide the secret data "A" in image files:

Step1: Convert the data from decimal to binary.
Data-----.>10000001
Step 2: Read image file.
Step3: Convert the image file from decimal to binary.
Step4: Break the byte to be hidden into bits.
10000001 ----------------- 10000001
Step5: Take first byte of original data from the image file.

CASE1 LSB-1 REPACEMENT
Step6: Replace the least significant bit by one bit of the data to be hidden.
- First byte of original data from the Cover Image: 10010000
-First bit of the data to be hidden:

[1]

-Replace least significant bit:

10010010

[1]

10010011
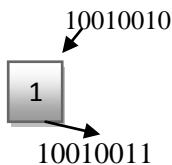
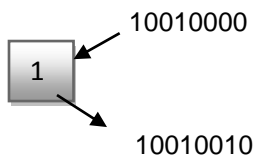Repeat the replace for all bytes of Cover Image

CASE2: ROBUST LSB-2 REPLACEMENT
step6: Replace LSB2 by one bit of the data to be hidden.
A- Select First byte of original data from the image file
- First bit of the data to be hidden is: 1
- Replace the LSB2: 10010000

[1]

10010010

- In our proposed method if the bit of the data to be hidden = = 1 and
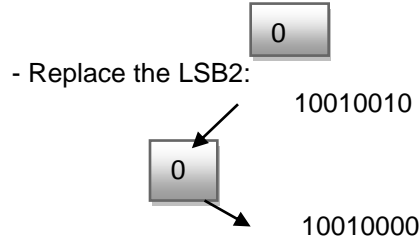
       LSB2= =0 then
1.   We change LSB1 of image to 0 after replacement.
          10010010
2.   we subtract 1
          10010000
  So we have no change image file
  B- Second byte of original data from the
      image file: 10010010
  -2nd bit of the data to be hidden

         0

   - Replace the LSB2:
             10010010

     0

            10010000

In our Proposed Method if the bit of the data to be hidden = = 0 and LSB2= =1
1. We change LSB1 of image to 1 after   replacement. 10010011
2. Increase one   10010010
So we have No change in data embedded image
Repeat the replace for all bytes of image

The system is tested using the images
as shown in **FIGURE**4&5
Example1

FIGURE4 (a): Sports Image.   **FIGURE4 (**b): Data Embedded Image.

Fig (a) shows the original sports image the data is embedded in it. Fig (b) shows the data embedded in the image. It should be noted that original sports image and data embedded sports image are exactly same.

Secret data used in our method is shown below", using steganography (way of hiding data) and SBR algorithm, we can 100% detect the guilty agent. Here Stego key used in this algorithm, Is as USERNAME (which is Unique).

In this, Guilty agent leaks the sports news from the BNN news channel, this agent name is ashwini.

Using proposed method the admin detect this agent as shown below,

"sports_INDASHWINI", So here guilty agent is "ASHWINI."
 Example2

FIGURE5 (a):Hindi_news Image.   FIGURE5 (b): Data Embedded Image.

 Fig (a) shows the original hindi_news image the data is embedded in it. Fig (b) shows the data
 embedded in the image. It should be noted that original hindi_news image and data embedded
 sports image are exactly same.

Secret data used in our method is shown below", using steganography (way of hiding data) and
SBR algorithm, we can 100% detect the guilty agent. Here Stego key used in this algorithm, Is as
USERNAME (which is Unique).

In this, Guilty agent leaks the sports news from the BNN news channel, this agent name is JOHN
Using proposed method the admin detect this agent as shown below,

"Hindi_newsJOHN",So here guilty agent is "JOHN."

Minimum distortions take place in data embedded image due to embedding small amount of data
using proposed method. the results shows that the proposed method is much more secure than
LSB.

5. CONCLUSION
The proposed algorithm used in this paper, encrypts the secret data before embedding it in the
image file with minimum distortions. We have also used an compression technique. We have
developed system in java based on proposed algorithm.

Here we have tested several JPEG images with secret data hidden and we can concluded that
resulting data embedded image do not have any noticeable changes.

This method is essential for construction of accurate targeted and blind steganalysis methods for
JPEG, BMP and PNG images. In this paper we have identified the use the concept of SBR hide
the given secret data into the image file.

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We are open to contributions, proposals for any topic as well as for editors and reviewers. We understand that it is through the effort of volunteers that CSC Journals continues to grow and flourish.

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- Peer-to-peer security
- Privacy protection
- Revocation of malicious parties
- Secure location determination
- Secure routing protocols
- Security in ad hoc networks

- Security in communications
- Security in distributed systems
- Security in e-mail
- Security in integrated networks
- Security in internet and WWW
- Security in mobile IP
- Security in peer-to-peer networks
- Security in sensor networks
- Security in wired and wireless integrated networks
- Security in wireless communications
- Security in wireless LANs (IEEE 802.11 WLAN, WiFi,

- Security in wireless PANs (Bluetooth and IEEE 802.
- Security specification techniques
- Tradeoff analysis between performance and security
- Viruses worms and other malicious code

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