
PROPOSED METHOD OF INFORMATION HIDING IN IMAGE

Hayder I. Hendi
Thiqar University Computer and
mathematic college Computer
department -Iraq
Hayderali_khazzai@yahoo.com

Shaker K. Ali
Thiqar University Computer and
mathematic college Computer
department -Iraq
shalynar@hotmail.com

ABSTRACT: Information hiding techniques have recently been useful in a many application areas, there are many techniques to achieve hiding data, and hiding text inside image is one field of them. In this paper we hiding our data in round of image without changing the details of image. The basic idea of the paper is to present a method that hides information in cover image using Least Significant Bit (LSB) of light part of image (.jpg) and coding method along with encryption so as to increase the security.

Keywords: Information Hiding, Cryptography, Steganography, cover image.

1. Introduction

The issue of security of information has gained special significance. One of the concerns in the area of Information security is the concept of hidden exchange of information [1]. Hiding information or image inside image is called steganography; The main purpose of steganography is to hide a message in some cover media, to obtain new data, practically indistinguishable from the original media [2].

According to a story from Herodotus, a slave's head was shaved by his master, Histiaëus, and tattooed with a secret message around 440 B.C. After growing the hair back, the message disappeared and then the slave journeyed to carry the message. When he shaved his head upon arriving, the message was revealed.[3]

Steganography is the ability of hiding data in redundant bits of any cover media. Its Target is to keep the secret information unreadable without damaging the cover media environment.

“Steganography replaces unneeded bits in image, sound, and text files with secret data. Instead of protecting data the way encryption does, steganography hides the very existence of the data.”[3].

There are several inclusion conventions and techniques that enable us to hide information in a specific object. All these conventions and techniques should achieve a number of requirements in order to be able to apply data hiding theory correctly. The following are some main requirements [3]:

1. The correct completion the hidden information when including it inside the carrier cover, so that the confidential message should not be changed in any way in case of adding information or changing any included information after it has been hidden. Changing the included data means the failure of the process.
2. The carrier medium that covers the confidential message should not be changed also, or at least its changes are not visible to unaided eye. In case these changes are large and visible, the person who watches will know that there is hidden information within the message and so will try to open or damage it.
3. Always taken into consideration that the attacker knows the existence of hidden information within the carrier cover.

2. Information Hiding using Steganography

The word steganography comes from the Greek Steganos, which mean covered or secret and –graphy mean writing or drawing. Therefore, steganography means, literally, covered writing. Steganography is the art and science of hiding information such that its presence cannot be detected [4] and a communication is happening [5]. A secret information is encoding in a manner such that the very existence of the information is concealed. Paired with existing communication methods, steganography can be used to carry out hidden exchanges.

The main goal of steganography is to communicate securely in a completely undetectable manner [6] and to avoid drawing suspicion to the transmission of a hidden data [7]. It is not to keep others from knowing the hidden information, but it is to keep others from thinking that the information even exists. If a steganography method causes someone to suspect the carrier medium, then the method has failed

Until recently, information hiding techniques received very much less attention from the research community and from industry than cryptography. This situation is, however, changing rapidly and the first academic conference on this topic was organized in 1996. There has been a rapid growth of interest in steganography for two main reasons [8]:

- (i) The publishing and broadcasting industries have become interested in

techniques for hiding encrypted copyright marks and serial numbers in digital films, audio recordings, books and multimedia products.

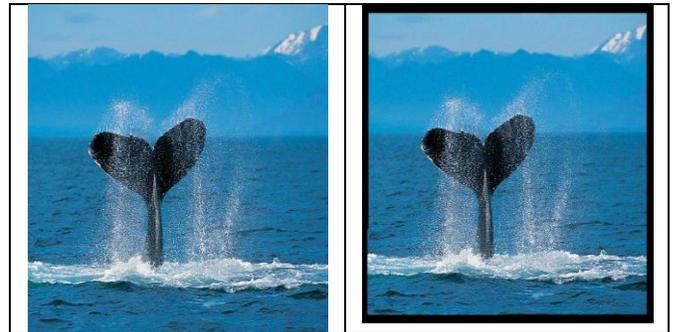
(ii) Moves by various governments to restrict the availability of encryption services have motivated people to study methods by which private messages can be embedded in seemingly innocuous cover messages.

The basic model of steganography consists of Carrier, Message and Password. Carrier is also known as cover-object, which the message is embedded and serves to hide the presence of the message. Basically, the model for steganography is shown on Figure 1 [9].

Message is the data that the sender wishes to remain it confidential. It can be plain text, ciphertext, other image, or anything that can be embedded in a bit stream such as a copyright mark, a covert communication, or a serial number. Password is known as stego-key, which ensures that only recipient who know the corresponding decoding key will be able to extract the message from a cover-object. The cover-object with the secretly embedded message is then called the stego-object.

3. proposed method:

The proposed method used color image has extended (.jpg) and the basic idea that used round of image because didn't has important information and the human always see the object of image more than round of image such fig(1).



Fig(1) show round of image

The proposed method used Least Significant Bit (LSB) light part of image for hides the data because color image has 24 bit per pixel (3 byte per pixel) used the third bit of third byte of pixel for hidden data into it such fig(2).

1	0	1	1	0	1	0	0
---	---	---	---	---	---	---	---

Fig(2) show the LSB bit that hidden on it

The proposed method algorithm that hidden into rounds of the image such that below:-

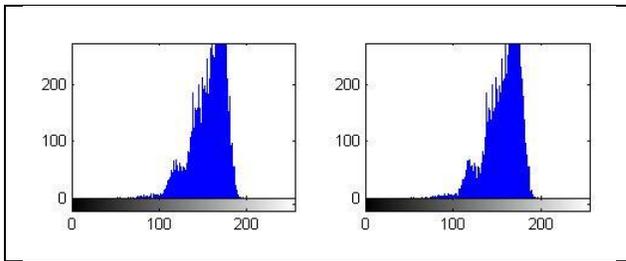
Let image A has size $[m,n]$ and the LSB is Least Significant Bit of the image $a[i,j]$ and T is text file has size L bits,

C=0

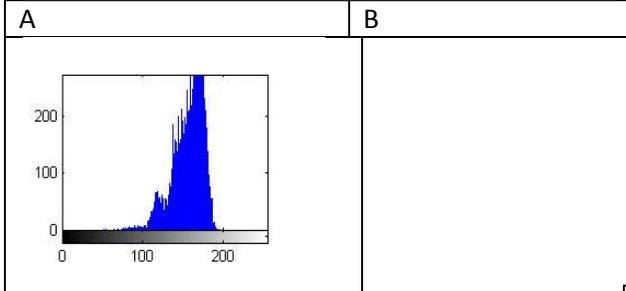
For i =0 to m do

For j =0 to n do

If $((I < 20) \text{ or } (I > m - 20) \text{ or } (j < 20) \text{ or } (j > n - 20))$ then



In fig(3) shows the original image and the proposed method of hidden will didn't see any noise into the image.



In fig(4) shows the histogram of the original image and proposed method and the classical hidden method .

C
Fig(4)show histogram : a) original image b) hidden image c) classical hidden image



A B

A B
Fig (3)show first experiment a) before hidden data b)after hidden data

Fig (5)show second experiment a) before hidden data b)after hidden data

If($n < L$) then

Begin

LSB=T[c]

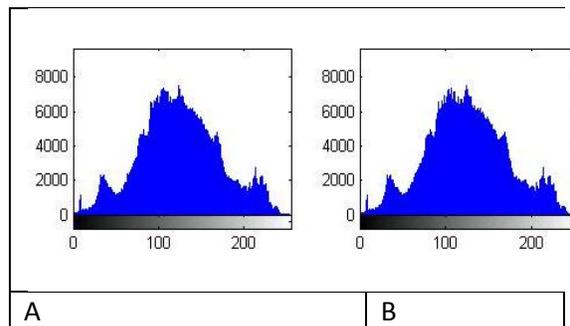
c=c+1

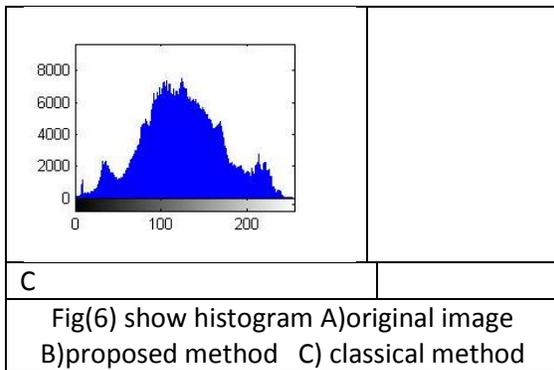
End

3. Experiment and Discussion

The proposed method implemented by using matlab (2008 a) and it was apply on two experiments has different size and draw the histogram of two experiments before and after the hidden

In fig (5) shows the original image and the proposed method of hidden will didn't see any noise into the image.





In fig (6) shows the original image and the proposed method of hidden will didn't see any noise into the image.

And applied the three noise metrics is (mse and snr and psnr)on the two experiments and give the result in table below

Table 1: shows noise tests of proposed methods

experiment s name	Mse	snr	psnr
Experiment 1	0.0177	$\times 10^3$ 8.6895	35.326
Experiment 2	0.0249	$\times 10^3$ 8.2410	9.266

And applied classic hidden on two experiments and make noise metrics on its and give the result in table below

Table 2: shows noise tests of classical methods

experiment s name	Mse	snr	psnr
Experiment 1	3.8910	$\times 10^3$ 3.3535	38.910
Experiment 2	9.9831	$\times 10^3$ 6.4258	99.831

4. Conclusion

The proposed method using the round of image for hidden data because the human eyes sensitive to the middle of image more than round of image and was apple on to two experiments and applied noise tests on it and compared with classical methods.

From tables (1, 2) was see the noise of proposed method low that classical method and the data hidden in proposed method less than classical method.

5. References

1. H.B.Kekre, Archana Athawale, Swarnalata Rao and Uttara Athawale "Information Hiding in Audio Signals"International Journal of Computer Applications (0975 – 8887) Vol.7, No.9, October 2010.
2. K. Geetha , and P.Vanitha Muthu "Implementation of ETAS (Embedding Text in Audio Signal) Model to Ensure Secrecy" International Journal on Computer Science and Engineering Vol. 02, No. 04, pp. 1308-1313, 2010.
3. Hebah H. O. Nasereddin & Murad Saleh Al Farzaei "Proposed Data Hiding Technique Text Image Inside Image (TIII) International Journal of Research and Reviews in Applied Sciences vol. 4, no.2, 2010.
4. M. Ramkumar & A.N. Akansu. "Some Design Issues For Robust Data hiding Systems", <http://citeseer.nj.nec.com/404009.html>
5. N.F. Johnson, S. Jajodia, "Staganalysis: The Investigation of

6. Hiding Information”, *IEEE*, pp. 113-116, 1998.
7. N.F. Johnson & S. Jajodia, “Steganalysis of Images Created Using Current Steganography Software”, in *Proceeding for the Second Information Hiding Workshop*, Portland Oregon, USA, April 1998, pp. 273-289
8. N.F. Johnson and S. Jajodia, “Exploring Steganography: Seeing the Unseen”, *IEEE*, pp. 26-34, 1998.
9. R.J. Anderson, F.A.P. Petitcolas, “On The Limits of Steganography”, *IEEE Journal of Selected Area in Communications*, pp. 474-481, May 1998.

C. Cachin, “An Information-Theoretic Model for Steganography”, in *proceeding 2nd Information Hiding Workshop*

//المستخلص

طريقة مقترحة لإخفاء البيانات في الصور الرقمية

<p>شاكر كاظم علي جامعة ذي قار كلية علوم الحاسبات والرياضيات</p>	<p>حيدر إبراهيم هندي جامعة ذي قار كلية علوم الحاسبات والرياضيات</p>
---	---

الخلاصة:- الإخفاء في الصور الرقمية من التقنيات الحديثة وتستخدم في مجالات عدة, منها الإخفاء النصوص داخل الصور الرقمية. في هذا البحث تناولنا طريقة مقترحة للإخفاء في محيط الصور الرقمية دون التغيير في المحتوى الداخلي للصورة وذلك باستخدام أقل بت ذات تأثير في جزء الإضاءة من صور ذات الامتداد واستخدمنا تشفير النص قبل إخفاءه في هذا البحث
(jpg)