Proposal for Exchange Text message Based on Image

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Received in : 1, September, 2010
Accepted in : 13, March, , 2011

Abstract

The messages are ancient method to exchange information between peoples. It had many ways to send it with some security.

Encryption and steganography was oldest ways to message security, but there are still many problems in key generation, key distribution, suitable cover image and others. In this paper we present proposed algorithm to exchange security message without any encryption, or image as cover to hidden. Our proposed algorithm depends on two copies of the same collection images set (CIS), one in sender side and other in receiver side which always exchange message between them.

To send any message text the sender Converts message to ASCII code. Chose one image from its (CIS) .Locate for each ASCII code in red or green or blue band color of chosen image. Store(x,y) location and color of correspond value. After that draw lines in graphic line image (GLI) by using this (x,y) and S (letter sequence) and color with white background.

Then send the graphic lines image (GLI) with serial number of chosen image from (CIS) to receiver. After receiving the (GLI) in other side, the receiver will choose image from its (CIS) according to serial number which it received then doing some steps to display the extract message.

Key words: steganography ,encryption , information hiding, mail ,history of mail, color image ,digital image.

Introduction

The messages are old method to exchange information between peoples, which had many ways to perform it .Some of them clay plaques, wood plaques, paper and others to write on it and then send by different ways without any security .In modern decade, the idea of exchange is still as it but the tools are different from country to other with more security and fast media to transfer it. Many methods had been used for message security. Encoding letters more security transmition between sender and receiver but the difficulty is to find and exchange of secret keys.

So the definition of *encoding* or *cipher* is the science of writing in secret codes , addresses all of the elements necessary for secure communication over an insecure channel, namely privacy, confidentiality, key exchange, authentication, and non-repudiation. But cryptography does not always provide safe communication.

Other methods used for security message by hidden the message into pallet of image file. The picture will not be modified, just the order of the color within the palette is slightly modified in order to keep our secret message ,a viewer unable to know what are the change, because the hidden message will be put inside the color palette using the lest significant bit(LSB). This method is from steganography methods .So the definition of *Steganography* is the science of *hiding* information. Whereas the goal of cryptography is to make data unreadable by a third party, the goal of steganography is to hide the data from a third party.

Other method mixed between encryption method and steganography method to more protect. But in our proposed algorithm to exchange security message without any encryption, or image as cover to hidden, by presenting new method to protect message and send with higher security by using image color pallet not as in encryption or steganography techniques by collecting set of image and sent it to receiver to use it with received graphic image, to extract text message without useing any key.

History of post

Mail, or post, is a method for transmitting information and tangible objects, where in written documents, typically enclosed in envelopes and also small packages are delivered to destinations around the world. Anything sent through the postal system is called mail or post. [1]

The art of communication by written documents carried by an intermediary from one person or place to another almost certainly dates back nearly to the invention of writing.

However, development of formal postal systems occurred much later. The first documented use of an organized courier service for the diffusion of written documents is in Egypt, where Pharaohs used couriers for the diffusion of their decrees in the territory of the State (2400 BC). [2]

Another important postal service was created in the Islamic world by the *caliph* Mu'awiyya; the service was called *barid*, by the name of the towers built to protect the roads by which couriers traveled.

Well before the Middle Ages and during them, homing pigeons were used for pigeon post, taking advantage of a singular quality of this bird, which when taken far from its nest is able to find his way home due to a particularly developed sense of orientation. Messages were then tied around the legs of the pigeon, which was freed and could reach his original nest.

Mail has been transported by quite a few other methods throughout history, including dogsled, balloon, rocket, mule, pneumatic tubes and even submarine. [3]

Modern mail is organized by national and privatized services, which are reciprocally interconnected by international regulations, organizations and international agreements. Paper letters and parcels can be sent to almost any country in the world relatively easily and cheaply. The Internet has made the process of sending letter-like messages nearly instantaneous, and in many cases and situations correspondents use electronic mail where previously they would have used letters (though the volume of paper mail continues to increase).[4]

The ordinary mail service was improved in the 20th century with the use of planes for a quicker delivery. The world's first scheduled airmail post service took place in the United Kingdom between the London suburbs of Hendon, North London, and Windsor, Berkshire, on 9 September 1911. Some methods of airmail proved ineffective, however, including the United States Postal Service's experiment with rocket mail. [5]

Digital images

Color image can be modeled as three band monochrome image data, where each band of the data corresponds to a different color. The actual information stored in the digital image data is brightness information in each spectral band. When the image is displayed, the corresponding brightness information is displayed on the screen by picture elements that emit light energy corresponding to that particular color. Typical color images are represented as red, green, and blue or RGB images .using the 8-bit monochrome standard as a model, the corresponding color image would have 24 bit/pixel – 8 bit for each color bands (red, green and blue). For many applications, RGB color information is transformed into mathematical space that decouples the brightness information from the color information**.** A digital image is

a representation of a two-dimensional image using ones and zeros (binary). Depending on whether or not the image resolution is fixed, it may be of vector or raster type. Without qualifications, the term "digital image" usually refers to raster images also called bitmap images [6].

Images have a finite set of digital values, called *picture elements* or pixels. The digital image contains a fixed number of rows and columns of pixels. Pixels are the smallest individual element in an image, holding quantized values that represent the brightness of a given color at any specific point. [7]

The idea of Proposal algorithm for Exchange secrets message (ESM)

The idea of proposal algorithm for exchange secret message is depends on collected set of images and gives each one of them serial number, then send to receiver a copy of this set images and with same serial number.

Now we have two copies of same set images one in sender side and the other in receiver side. as in fig (1).

To send any text message the sender prepare the text message and choose one image from his image set with its serial number and convert first character of text message to its ASCII value (which its value not more than 255) and then search for this ASCII value in red band of chosen image if found then store location of this pixel (by store (x,y)) .

Now we have four parameters (x,y ,s and r)

- x,y :- location of pixel
- S :- sequence of character in text message and column number in graphic image.
- R:- red color.

By using these four parameters to draw line in image box with start point(s,x) and end point (s,y),with red color for the following text message *" Steganography is the ancient art of embedding a secret message into a seemingly harmless message* " by using one image from the bellow collection images set which is the serial number for it (81239) show in Fig (2)

Else if we not found ASCII value of character in red band then search it in green band and determine four parameter with green color .

Else search for it in blue band and determine the four parameter with blue color and draw line in image box. Now we have one line with color red or green or blue in image box represents first character of text message this procedure repeat to each character one after other.

After converting text message to color line we will get new image with line shape with different colors in white background.

Add serial number of chosen image to graphical lines image (GLI), and then send it to receiver.

In receiver side, to extraction text message the receiver will:

Choose image from image set according to receive serial number and then read received graphic line image (GLI) column by column to determine starting point(s,x) and end point (s,y) of color line ,now the reciever has four parameters x,y ,s and color which means:-

- x,y the location of pixel value in chosen image .
- S the sequence of character in text message and column number in graphic lines image (GLI)
- C the color band of (x,y)point .

Note:- The value of pixel(x,y) for C color band represents character value ($char_1$).

Repeat upper procedure with each column of new line image (NLI).

Concatenate $char_1, char_2, \ldots\ldots char_n$ to display the text message.

Algorithm of proposal (ESM)

The proposal algorithm has three stages as following:

1- **Start stages:** to prepare images set:-

1.1 collection set images (CIS)

1.2 gives serial number for each image in the set

1.3 sends copy of collected images set (CIS) with its serial number to receiver

2- Sender side stage: to send message :-

2.1 chose one image from (CIS) with its serial number

2.2 prepare text message

2.3 for i^{th} character in text message convert it to ASCII code

2.4 For each pixel in chosen (CIS) compute red, green, and blue values as following:

r= pixel (x,y) mode 256

g=int (pixel(x,y) /256) mod 256

b=int (pixel(x,y) /(256)^2)mod256

Where r, g and b >=0 and r,g and b<=255

2.5 locate for ASCII value of i^{th} character in r band of pixel color if found:-

- Store(x,y) of pixel location.
- Store i^{th} character in(S) which represents sequence of character
- Store color band (CB)

Else repeat step 2.5 with g band of pixel color

Else repeat step2.5 with b band of pixel color

2.6 draw line in graphic line image (GLI) use the following parameters

- Start point of line is(s,x)
- End point of line is(s,y)
- Color of line is (CB)

2.7 add 1 to i^{th}

2.8 repeat steps from 2.3 to 2.7 until end of text message.

2.9 sent graphic line image (GLI) with white background and chosen (CIS) serial number

3- Receiver side stage: to extract text message

3.1 choose image from received (CIS) according to received serial number r

3.2 for each column in received (GLI) with not white color locate for line start point and end point for

-store start point in(s,x) in c^{th} column

-store end point in(s,y) in c^{th} column

-store color of line in (CL) color line

3.3 locate for pixel (x,y) in chosen (CIS) with (CL) band color and

-convert its value to character

-store the character in $char_s$ where s represents the sequence character in text message

3.4 add 1 to c^{th}

3.5 repeat the steps from 3.2 to 3.3

3.6 concatenate $char_1, char_2, \ldots\ldots char_n$ due to its (sequence as in s)

4- **End stage**:-display the text message

6. Implementation of proposal algorithm (ESM)

The proposal algorithm (ESM) is implemented by VB computer language with following three stage:-

1. Stage of message send:-After collected image set and send it to receiver with serial number for each image.

We can send text message which transmitted to (GLI) with following steps:

a- Input text message

b- Choose one image from (CIS)

c- Save new image box with serial number

Notes**:** when text message box is empty the program displays alarm message box to input message.

2. Stage of send new image box (NIB):- this stage can be doing with many ways of transmission such internet and others

3. Stage of extract text image: - in this stage extract the message from received (NIB) and serial number as in fig (3).

Conclusion

Send message is stays an important task since every exchange information depends on exchanging message so in our paper we try to present new which has good properties to be simple method with high security .many point we conclude from the work such as:

1- The proposal algorithm have high security because there is no hacker can discover the message from (NIB) or change in source image in(CIS) but the hacker may cause noise by change in (GLI)

2- Each message can be send in many (NIB) by chose other image from (CIS)

3-The proposal method does not match steganography and encryption method

4- Its simple method does not need key to security and does not need cover to hide the message.

5- The same collect images set (CIS) can used with infinite time with infinite message.

6- There is no value of any character in (NIB) only location of that value characters in (CIS) of sender

7- we can't use a lot of information in the text message because we need a huge number of pixel

8- This algorithm is used with peoples who always exchange message between them.

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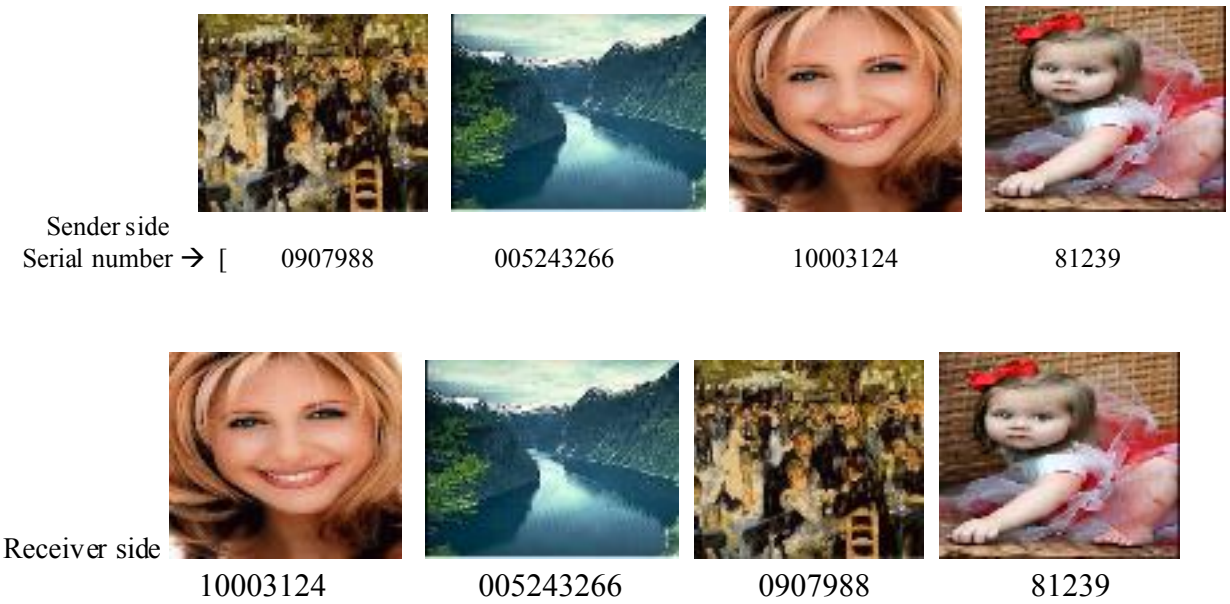
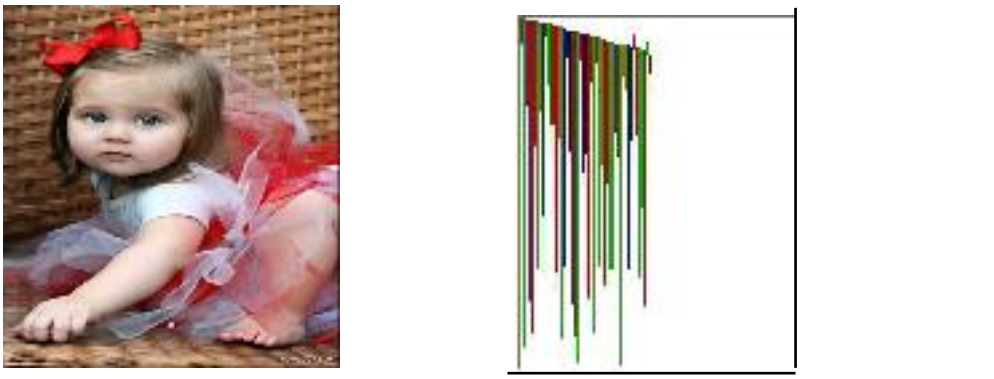


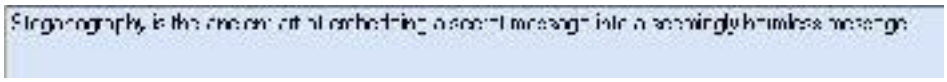
Fig. (1): Two copies of same collection images set (CIS) one in sender side and the other receiver side and each image have serial number

A B

Fig. (2): A:- source image from (CIS)the serial number for it(81239)
B:- using four parameter (x,y,s,r) to draw graphical line image (GLI)



A B



C

Fig .(3): A:-(CIS) B:-(NIB) C:- Extract message

مقترح لتبادل الرسائل بالاعتماد على الصور

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استلم البحث في: 1، ايلول،2010
قبل البحث في: 13،اذار ، 2011

الخلاصة

الرسائل هي طريقة قديمة لتبادل المعلومات بين الناس .هناك طرائق عديدة لإرسال الرسائل مع بعض السرية .التشفير(Encryption) وطريقة إخفاء البيانات (Steganography) هي طرائق قديمة للحفاظ على أمنية الرسائل ولكن مازالت هناك مشاكل عديدة في إيجاد المفتاح أو توزيعه أو استخدام الصورة المناسبة غطاء" .....الخ

في هذا البحث سنقدم خوارزمية مقترحة لتبادل الرسائل بصورة سريه من دون استخدام أي مفتاح للتشفير أو استخدام صورة للإخفاء فيها.

خوارزميتنا المقترحة تعتمد مجموعتين متماثلتين من الصور(CIS) .واحدة لدى المرسل والأخرى لدى المستلم حيث إنهم يكونون معتادين على تبادل الرسائل .ولإرسال أي رسالة نصية يقوم المرسل بتحويل الرسالة إلى (ASCII CODE) ثم يقوم باختيار صورة واحدة من مجموعة الصور التي لديه(CIS) ويحدد موقع لكل (ASCII CODE) في مصفوفة اللون الأحمر أو الأخضر أو الأزرق(RGB) من الصورة المحددة ويخزن مواقع (x,y) وألوانها لكل قيمة تماثلها في(ASCII CODE) التي تم تحديدها مسبقا ثم ترسم مجموعة من الخطوط في صورة واحدة بالاعتماد على إحداثيات (x,y) وتسلسل كل حرف واللون ،باستعمال خلفية بيضاء ومن ثم يقوم بإرسال الصورة المرسومة والمتكونة من الخطوط مع الرقم التسلسلي للصورة الأصلية التي تم اختيارها من (CIS) وإرسالها إلى المستلم . بعد استلام الصورة المرسومة (GLI) من المستلم .يقوم المستلم باختيار الصورة المحددة من الصور التي لديه(CIS) بالاعتماد على الرقم التسلسلي المرسل ويقوم بخطوات عديدة لعرض الرسالة المستخلصة.

الكلمات المفتاحية :-

steganography ,encryption , information hiding, mail ,history of mail, color image ,digital image.