Steganography Using Image Processing for Data Security

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Abstract: **Steganography is the art of hiding the fact that communication is taking place, by hiding information in other information. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the internet. For hiding secret information in images, there exist a large variety of steganography techniques some are more complex than others and all of them have respective strong and weak points. Different applications may require absolute invisibility of the secret information, while others require a large secret message to be hidden. The main goal of this paper is to explore and discuss an overview of image steganography, its uses and techniques. It also attempts to identify the requirements of a good steganography algorithm and briefly reflects on which steganographic techniques are more suitable for which applications.**

The paper "steganography Using Image Processing" is developed to replace the currently existing system, which helps hiding information in digital media. In contrast to cryptography, it is not to keep others from knowing the hidden information but it is to keep others from thinking that the information even exists. Information hiding is an emerging research area, which encompasses applications such as copyright protection for digital media, watermarking, fingerprinting, and steganography.

Keywords: **steganography, cryptography**

1. INTRODUCTION

Steganography become more important as more people join the cyberspace revolution. Steganography is the art of concealing information in ways that prevents the detection of hidden messages. Steganography include an array of secret communication methods that hide the message from being seen or discovered.

Due to advances in ICT, most of information is kept electronically. Consequently, the security of information has become a fundamental issue. Besides cryptography, steganography can be employed to secure information. In cryptography, the message or encrypted message is embedded in a digital host before passing it through the network, thus the existence of the message is unknown. Besides hiding data for confidentiality, this approach of information hiding can be extended to copyright protection for digital media: audio, video and images.

The growing possibilities of modern communications need the special means of security especially on computer network. The network security is becoming more important as the number of data being exchanged on the internet increases. Therefore, the confidentiality and data integrity are requires to protect against unauthorized access and use. This has resulted in an explosive growth of the field of information hiding

2.STEGANOGRAPHY TECHNIQUES

2.1. Image Steganography and bitmap picture:

Using bitmap pictures for hiding secret information is one of most popular choices for Steganography. Many types of software built for this purpose, some of these software use password protection to encrypting information on picture. This software provide the solution of this problem, it can accept any type of image to hide information file, but finally it give the only "BMP" image as an output that has hidden file inside it.

2.2. Bitmap Steganography:

Bitmap type is the simplest type of picture because that it doesn't have any technology for decreasing file size. Structure of these files is that a bitmap image created from pixels that any pixel created from three colours (red, green and blue said RGB) each colour of a pixel is one byte information that shows the density of that colour. Merging these three colours makes every colour that we see in these pictures. We know that every byte in computer science is created from 8 bit that first bit is Most-Significant-Bit (MSB) and last bit Least-Significant-Bit (LSB), the idea of using Steganography science is in this place; we use LSB bit for writing our security information inside BMP pictures. So if we just use last layer (8st layer) of information, we should change the last bit of pixels, in other hands we have 3 bits in each pixel so we have 3*height*width bits memory to write our information. But before writing our data we must write name of data (file), size of name of data & size of data. We can do this by assigning some first bits of memory (8st layer).

(00101101 00011101 11011100)
(10100110 11000101 00001100)
(11010010 10101100 01100011)

The present Existing System are Steganography Vs Cryptography and Steganography Vs Watermarking:

3. PROPOSED SYSTEM

Steganography system requires any type of image file and the information or message that is to be hidden. It has two modules encrypt and decrypt.

Microsoft .Net framework prepares a huge amount of tool and options for programmers that they simples programming. One of .Net tools for pictures and images is auto-converting most types of pictures to BMP format. I used this tool in this software called “Steganography” that is written in C#.Net language and you can use this software to hide your information in any type of pictures without any converting its format to BMP (software converts inside it).

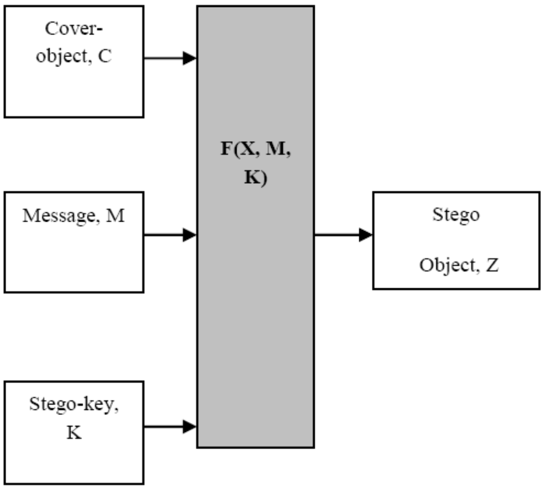
The algorithm used for Encryption and Decryption in this application provides using several layers lieu of using only LSB layer of image. Writing data starts from last layer (8st or LSB layer); because significant of this layer is least and every upper layer has doubled significant from its down layer. So every step we go to upper layer image quality decreases and image retouching transpires.

The encrypt module is used to hide information into the image; no one can see that information or file. This module requires any type of image and message and gives the only one image file in destination.

The decrypt module is used to get the hidden information in an image file. It take the image file as an output, and give two file at destination folder, one is the same image file and another is the message file that is hidden it that.

Before encrypting file inside image we must save name and size of file in a definite place of image. We could save file name before file information in LSB layer and save file size and file name size in most right-down pixels of image. Writing this information is needed to retrieve file from encrypted image in decryption state.

4.IMPLEMENTATION MODEL



The model for steganography is shown in figure1:

Message is the data that the sender wishes to remain it confidential. It can be plain text, cipher text, 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 knows 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.

Recovering message from a stego-object requires the cover-object itself and a corresponding decoding key if a stego-key was used during the encoding process. The original image may or may not be required in most applications to extract the message.

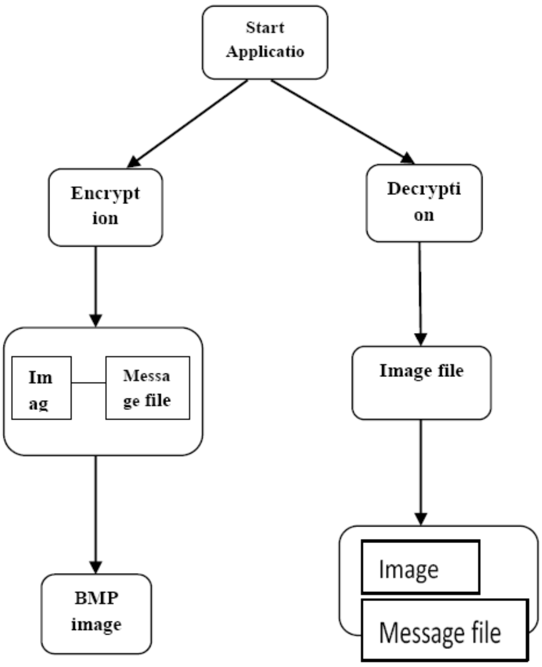
There are several suitable carriers below to be the cover-object*:*

- Network protocols such as TCP, IP and UDP
- Audio that using digital audio formats such as wav, midi, avi, mpeg, mpi and voc
- File and Disk that can hides and append files by using the slack space
- Text such as null characters, just alike Morse code including html and java

- Images file such as bmp, gif and jpg, where they can be both colour and gray-scale.

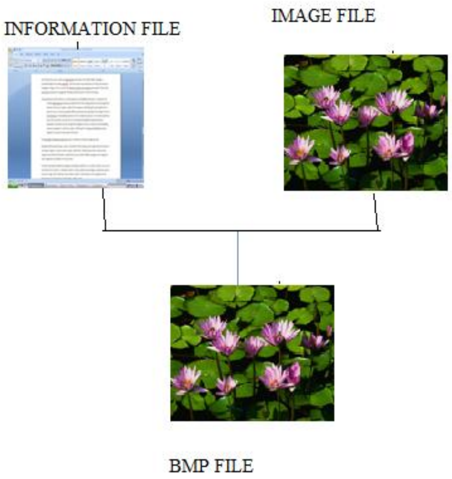
In general, the information hiding process extracts redundant bits from cover-object. The process consists of two steps:

- Identification of redundant bits in a cover-object. Redundant bits are those bits that can be modified without corrupting the quality or destroying the integrity of the cover-object.
- Embedding process then selects the subset of the redundant bits to be replaced with data from a secret message. The stego-object is created by replacing the selected redundant bits with message bits

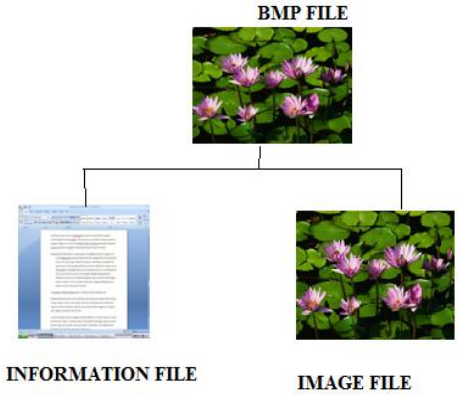


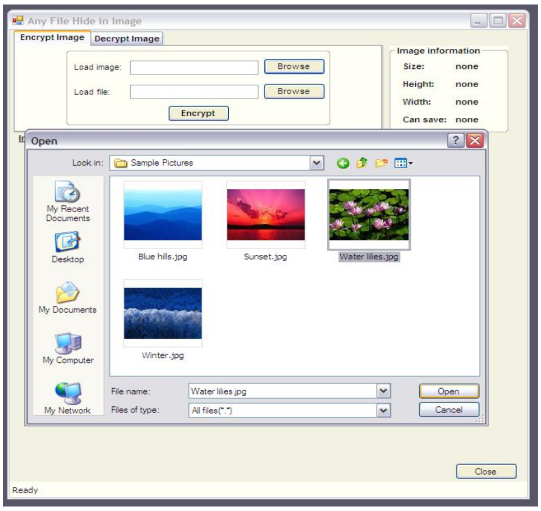
The graphical representation of this system is as shown in figure 2:

Encryption Process



Decryption Process





Load image:

Load file:

Image information

Size: none

Height: none

Width: none

Can save: none

Look in: Sample Pictures

File name: Water lilies.jpg

Files of type: All files(*.*)

Ready

5. CONCLUSION

Steganography is a really interesting subject and outside of the mainstream cryptography and system administration that most of us deal with day after day.Steganography can be used for hidden communication.A stego-key has been applied to the system during embedment of the message into the cover image.This steganography application software provided for the purpose to how to use any type of image formats to hiding any type of files inside them. The master work of this application is in supporting any type of pictures without need to convert to bitmap, and lower limitation on file size to hide, because of using maximum memory space in pictures to hide the file. The recent explosion of research in watermarking to protect intellectual property is evidence that steganography is not just limited to military or espionage applications. Steganography, like cryptography, will play an increasing role in the future of secure communication in the “digital world”.

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