SYNOPSIS

Title: Image Steganography

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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 exists 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. This project report intends to give 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.

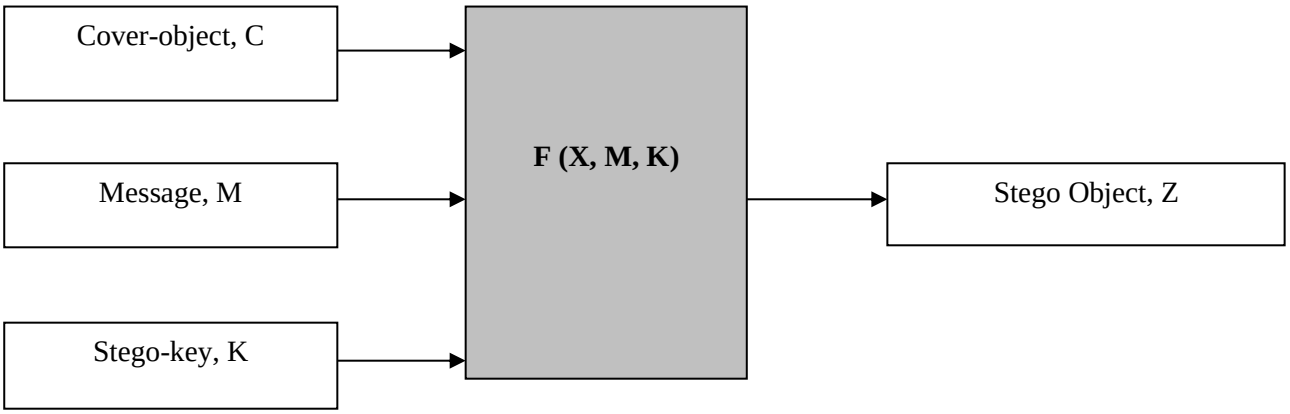
OVERVIEW

The word steganography comes from the Greek “Seganos”, which mean covered or secret and – “graphy” mean writing or drawing. Therefore, steganography means, literally, covered writing. It is the art and science of hiding information such its presence cannot be detected and a communication is happening. 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 this projects it to communicate securely in a completely undetectable manner and to avoid drawing suspicion to the transmission of a hider data. There has been a rapid growth of interest in steganography for two reasons:

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

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.



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*.

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

PROJECT PURPOSE

Image Steganography allows for two parties to communicate secretly and covertly. It allows for some morally-conscious people to safely whistle blow on internal actions; it allows for copyright protection on digital files using the message as a digital watermark.

PROJECT SCOPE

This project is developed for hiding information in any image file. The scope of the project is implementation of steganography tools for hiding information includes any type of information file and image files and the path where the user wants to save Image and extruded file.

PROPOSED SYSTEM

Steganography is the practice of hiding private or sensitive information within something that appears to be nothing out to the usual. Steganography is often confused with cryptology because the two are similar in the way that they both are used to protect important information. The difference between two is that steganography involves hiding information so it appears that no information is hidden at all. If a person or persons views the object that the information is hidden inside of he or she will have no idea that there is any hidden information, therefore the person will not attempt to decrypt the information.

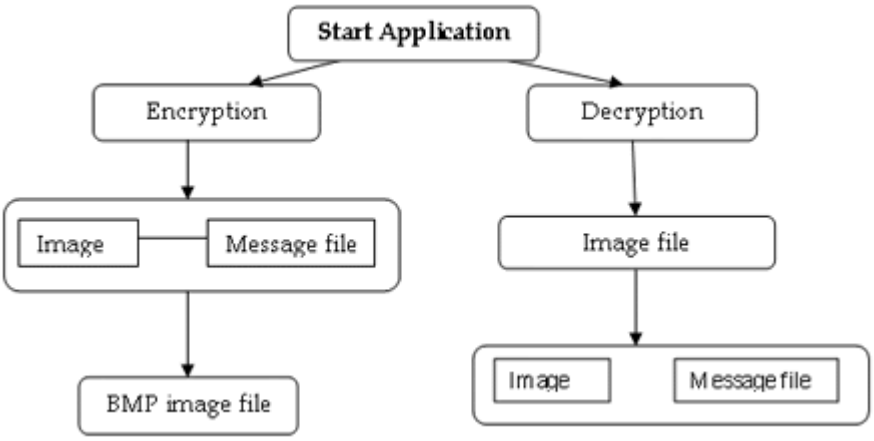
What steganography essentially does is exploit human perception, human senses are not trained to look for files that have information inside of them, although this software is available that can do what is called Steganography. The most common use of steganography is to hide a file inside another file.

Methodology:

User needs to run the application. The user has two-tab options – encrypt and decrypt. If user select encrypt, application give the screen to select image file, information file and option to save the image file. If user select decrypt, application gives the screen to select only image file and ask path where user want to save the secrete file.

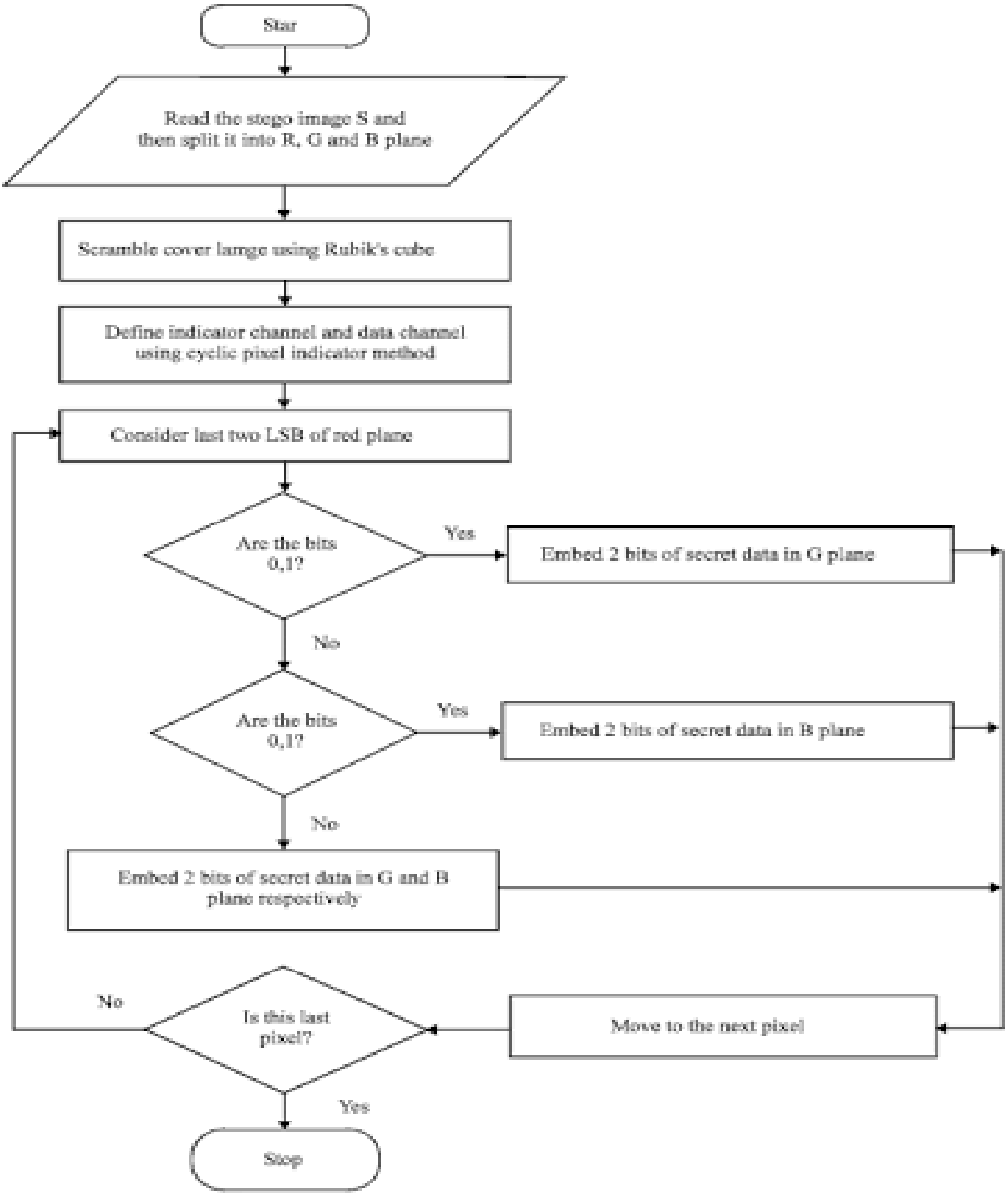
- This project has two methods – Encrypt and Decrypt.
- In encryption the secret information is hiding in with any type of image file.
- Decryption is getting the secret information from image file.
- The art of detecting Steganography is referred to as **Steganalysis.**

To put is simply Steganalysis involves detecting the use of Steganography inside of a file. Steganalysis does not deal with trying to decrypt the hidden information inside of a file, just discovering it.



There are many methods that can be used to detect Steganography such as:

"Viewing the file and comparing it to another copy of the file found on the Internet (Picture file). There are usually multiple copies of images on the internet, so you may want to look for several of them and try and compare the suspect file to them. For example, if you download a JPED and your suspect file is also a JPED and the two files look almost identical apart from the fact that one is larger than the other, it is most probable you suspect file has hidden information inside of it.



That is the way the algorithm changes the vessel and the severity of such an operation determines with no doubt the delectability of the message, since delectability is a function of file characteristics deviation from the norm, embedding operation attitude and change severity of such change decides vessel file delectability.

A typical triangle of conflict is message Invisibility, Robustness, and Security. Invisibility is a measure of the in notability of the contents of the message within the vessel. Security is sinominous to the cryptographic idea to message security, meaning inability of reconstruction of the message without the proper secret key material shared. Robustness refers to the endurance capability of the message to survive distortion or removal attacks intact. It is often used in the watermarking field since watermarking seeks the persistence of the watermark over attacks, steganographic messages on the other hand tend to be of high sensitivity to such attacks. The more invisible the message is the less secure it is (cryptography needs space) and the less robust it is (no error checking/recovery introduced). The more robust the message is embedded the more size it requires and the more visible it is.

Image Steganography and bitmap pictures:

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. To use this software, you must have a 'BMP' format of a pictures to use it, but using other type of pictures like "JPEG", "GIF" or any other types is rather or never used, because of algorithm of "BMP" pictures for Steganography is simple. Also, we know that in the web most popular of image types are "JPEG" and other types not "BPM", so we should have a solution for this problem.

This software provides the the solution of this problem, it can accept any type of image to hide information file, but finally it gives the only "BMP" image as an output that has hidden file inside it.

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 colors (red, green and blue said RGB) each color of a pixel is one-byte information that shows the density of that color. Merging these three color makes every color 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*hight*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)

Using each 3 pixels of picture to save a byte of data

System Analysis & Design

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.

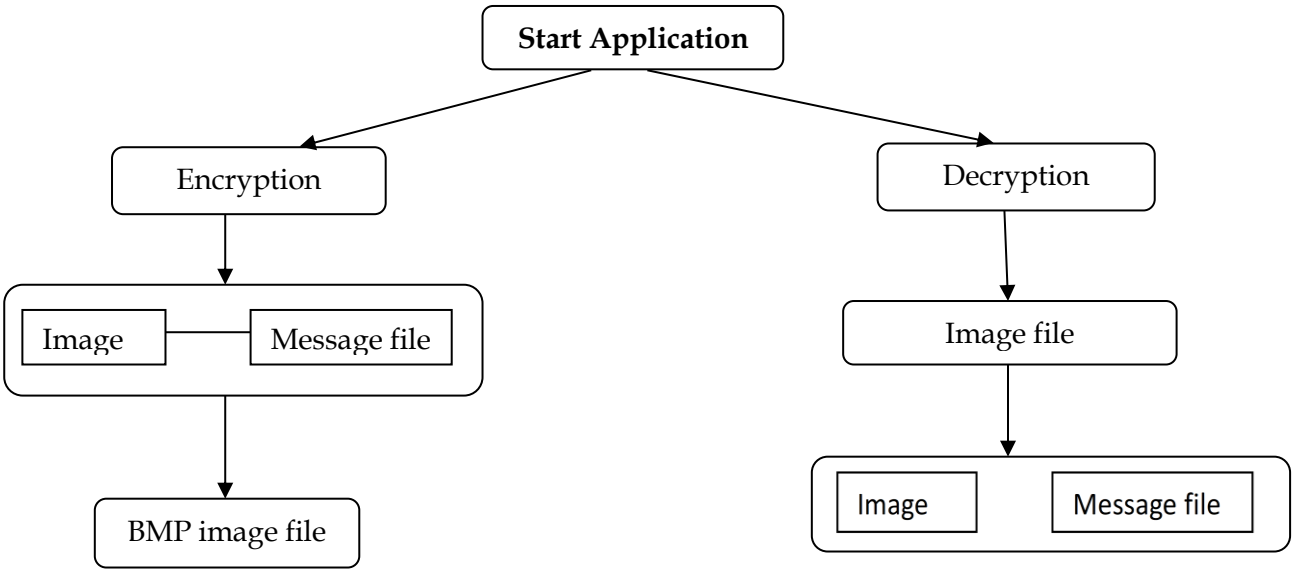
Microsoft .Net framework prepares a huge amount of tool and options for programmers that they simples programming. One of .Net tools for pictures and images is auto-converting most types of pictures to BMP format. I used this tool in this software called "Steganography" that is written in C#.Net language 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 takes the image file as an output, and give two files 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 down pixels of image. Writing this information is needed to retrieve file from encrypted image in decryption state.

The graphical representation of this system is as follows:



SYSTEM REQUIREMENT

Software Requirements:

- **.NET Framework 3.5**

Hardware Requirements:

Processor: 1.0 GHz or Greater.

RAM: 4 GB DDR4 RAM.

OBJECTIVE

The goal of steganography is covert communication. So, a fundamental requirement of this steganography system is that the hider message carried by stego-media should not be sensible to human beings.

The other goad of steganography is to avoid drawing suspicion to the existence of a hidden message. This approach of information hiding technique has recently became important in a number of application area

This project has following objectives:

- To product security tool based on steganography techniques.
- To explore techniques of hiding data using encryption module of this project
- To extract techniques of getting secret data using decryption module.

Steganography sometimes is used when encryption is not permitted. Or, more commonly, steganography is used to supplement encryption. An encrypted file may still hide information using steganography, so even if the encrypted file is deciphered, the hidden message is not seen.

CONCLUSION

Steganography is useful for hiding messages for transmission. One of the major discoveries of this investigation was that each **steganographic** implementation carries with its significant trade-off decisions, and it is up to the steganographic to decide which imp emendation carries with its significant trade-off decisions, and it is up to the steganographer to decide which implementation suits him/her best.

REFERENCES

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