

1.INTRODUCTION

- Steganography is the special technique that encrypts the data inside the bits of media such as image.
- Anography Steganography is the practice of concealing a file, message, image, or video within another file, message, image, or video. The word steganography combines the Greek words steganos, meaning "covered, concealed, or protected," and graphein meaning "writing".
- The first recorded use of the term was in 1499 by Johannes Trithemius in his Steganographia, a treatise on cryptography and steganography, disguised as a book on magic.
- The advantage of steganography over cryptography alone is that the intended secret message does not attract attention to itself as an object of scrutiny. Plainly visible encrypted messages, no matter how unbreakable they are, arouse interest and may in themselves be incriminating in countries in which encryption is illegal.
- Whereas cryptography is the practice of protecting the contents of a message alone, steganography is concerned with concealing the fact that a secret message is being sent as well as concealing the contents of the message.
- Steganography includes the concealment of information within computer files. In digital steganography, electronic communications may include steganographic coding inside of a transport layer, such as a document file, image file, program or protocol. Media files are ideal for steganographic transmission because of their large size. For example, a sender might start with an innocuous image file and adjust the color of every hundredth pixel to correspond to a letter in the alphabet. The change is so subtle that someone who is not specifically looking for it is unlikely to notice the change.

2.NEED OF THE SYSTEM

- The bits are changed using algorithm like SHA-1(Secure Hash Algorithm).
- This application will be very useful to those which requires very great level of security.
E.g.: A company, security agencies might send sensitive information by hiding it inside the image by using this technique.
- There is a wide assortment of steganography methods that can help to hide information's that are secreted in images. Some of these techniques are more complex than the others.
- Various kinds of file formats can be used for this but the technique of using digital images is quite well known especially because of the high frequency on the internet.
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- . Absolute visibility is required by some of the applications for hiding the secret information while another requires huge secret information's.

3.HARDWARE AND SOFTWARE SPECIFICATION

❖ HARDWARE SPECIFICATION:

- 1) RAM-512MB(Minimum) / 1GB(Recommended)
- 2) Hard Disc (space required)-500MB(Minimum) / 1GB(Recommended)
- 3) Processor- Dual core
- 4) Operating System- Any Linux open-source platform

❖ SOFTWARE SPECIFICATION:

- 1) C++(11 standard) with GCC (GNU Compiler Collection)
- 2) Libraries: OpenCV, OpenSSL, gtkmm

4.FEASIBILITY STUDY

- The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- 1) ECONOMICAL FEASIBILITY
- 2) TECHNICAL FEASIBILITY
- 3) SOCIAL FEASIBILITY

ECONOMICAL FEASIBILITY:

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY:

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

5.SYSTEM STUDY AND ANALYSIS

❖ Existing system:

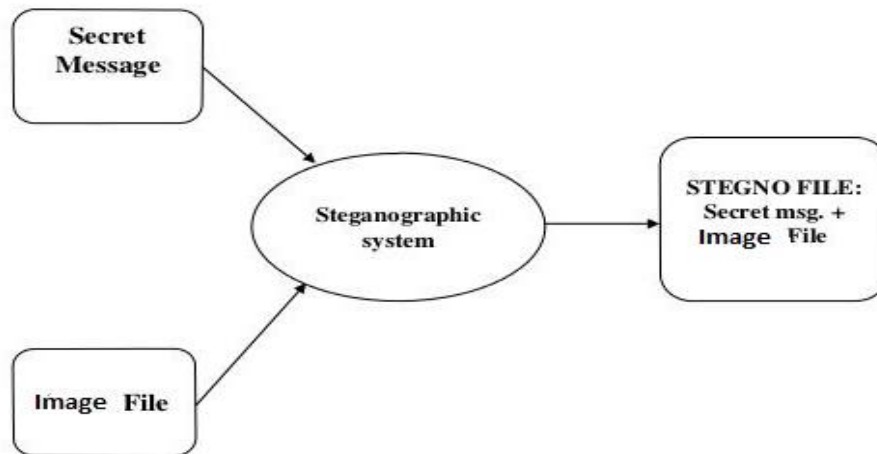
- We find that in most existing approaches, the choice of embedding positions within a cover image mainly depends on a pseudorandom number generator without considering the relationship between the image content itself and the size of the secret message.
- We find that the existing PVD-based approaches (Pixel Value Differencing) cannot make full use of edge information for data hiding, and they are also poor at resisting some statistical analyses.

❖ Proposed system:

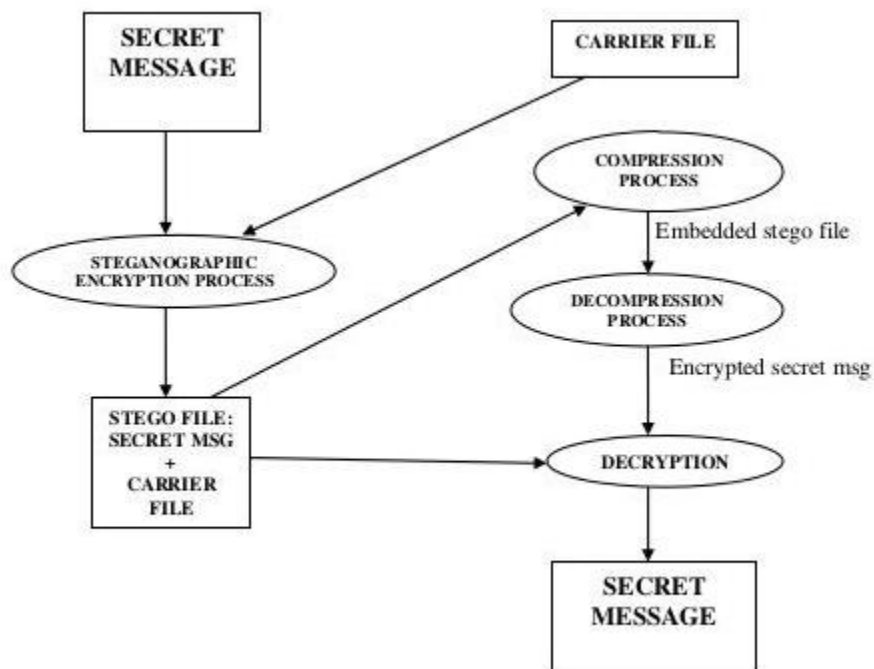
- We developed the system using SHA-1 function algorithm, which is provided by the library OpenSSL.
- It deals with the bits of the image and encrypts the data by checking the capacity of the image. That means whether an image is a large enough or capable of hiding the given lines of text or not.
- As SHA-1 deals with the color bits, it is faster as compared to deal with whole pixel at a time and extremely minor changes are much difficult to identify.

6.SYSTEM DESIGN

❖ **DFD: -**



❖ **Level 1 DFD: -**



❖ **ERD:-**



7.SCREEN LAYOUTS

- Compile all necessary C++ source files to create respective executable and object files.

```
ameypc@linux: ~/MyStuff/works/projects/C++/steganography
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ make
Compiling src/MatImage.cc
Compiling src/TextFile.cc
Compiling src/util.cc
Compiling src/Error.cc
Compiling src/steg.cc
Making steg
Compiling src/unsteg.cc
Making unsteg
ameypc@linux:~/MyStuff/works/projects/C++/steganography$
```

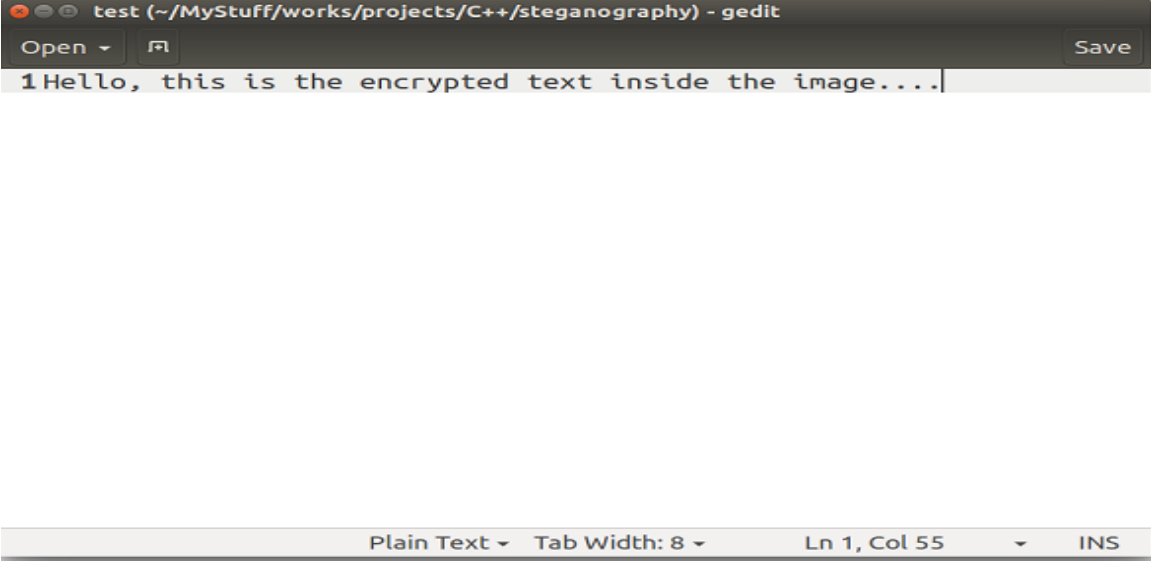
- Command with options to perform necessary operations as required.

```
ameypc@linux: ~/MyStuff/works/projects/C++/steganography
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ ./steg --help
USAGE:
  steg [OPTION...] IMAGE-FILE

OPTIONS:
  -h, --help            display this help message
  -f, --text-file=FILE  set the text file to encrypt
  -p, --password=PASSWD set the password
  -o, --out-file=FILE   set the output stego-image filename

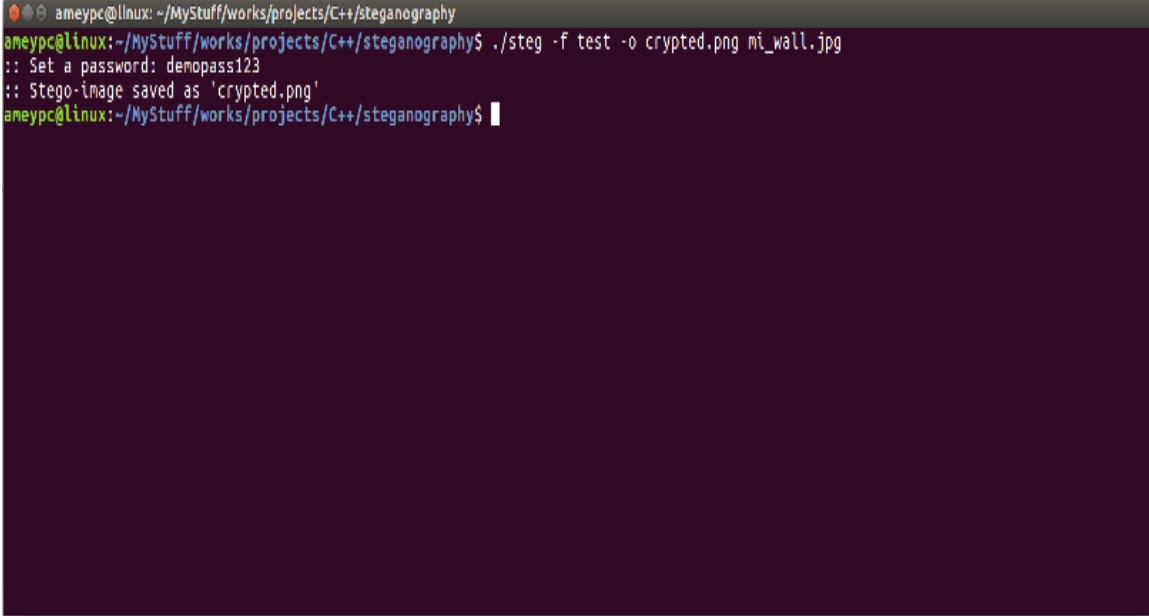
If a text file is not provided by options, the program will take
the text from STDIN.
ameypc@linux:~/MyStuff/works/projects/C++/steganography$
```

- Text file 'test' containing text to be encrypted.



The screenshot shows a gedit text editor window titled "test (~/MyStuff/works/projects/C++/steganography) - gedit". The window has a menu bar with "Open" and "Save" options. The main text area contains a single line of text: "1Hello, this is the encrypted text inside the image....". The status bar at the bottom indicates "Plain Text", "Tab Width: 8", "Ln 1, Col 55", and "INS".

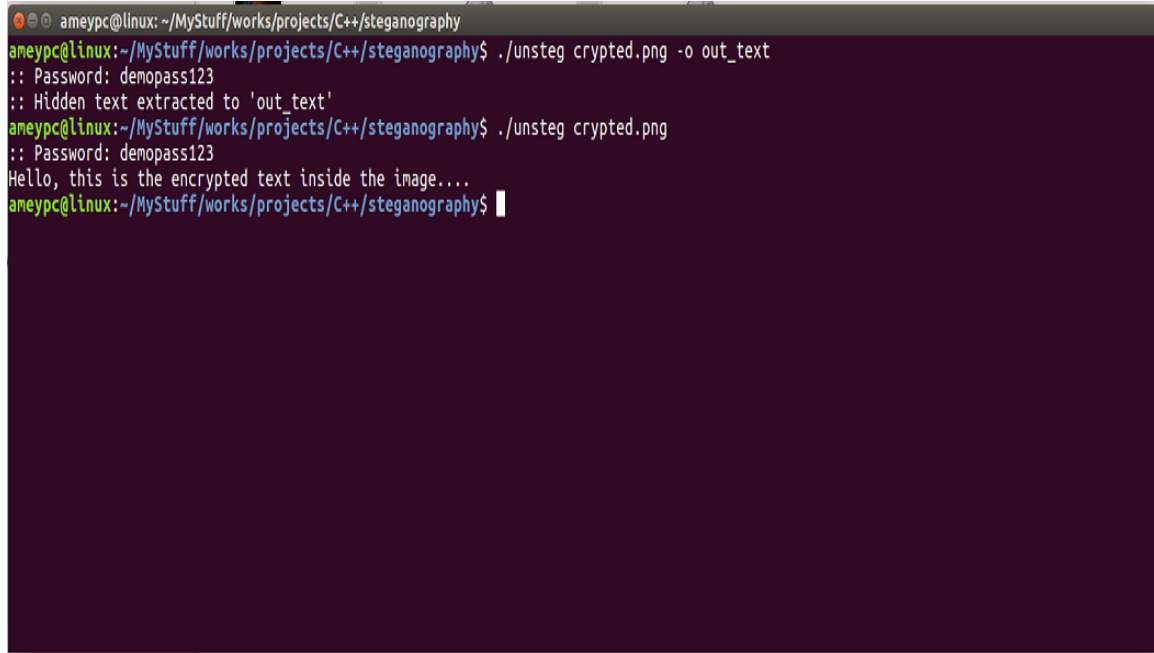
- Encrypt command with text file 'test' contain message to hide output image file 'crypted.png' in which the text in text file to be hidden and the original image 'mi_wall.jpg'. password is set for security.



The screenshot shows a terminal window with the following commands and output:

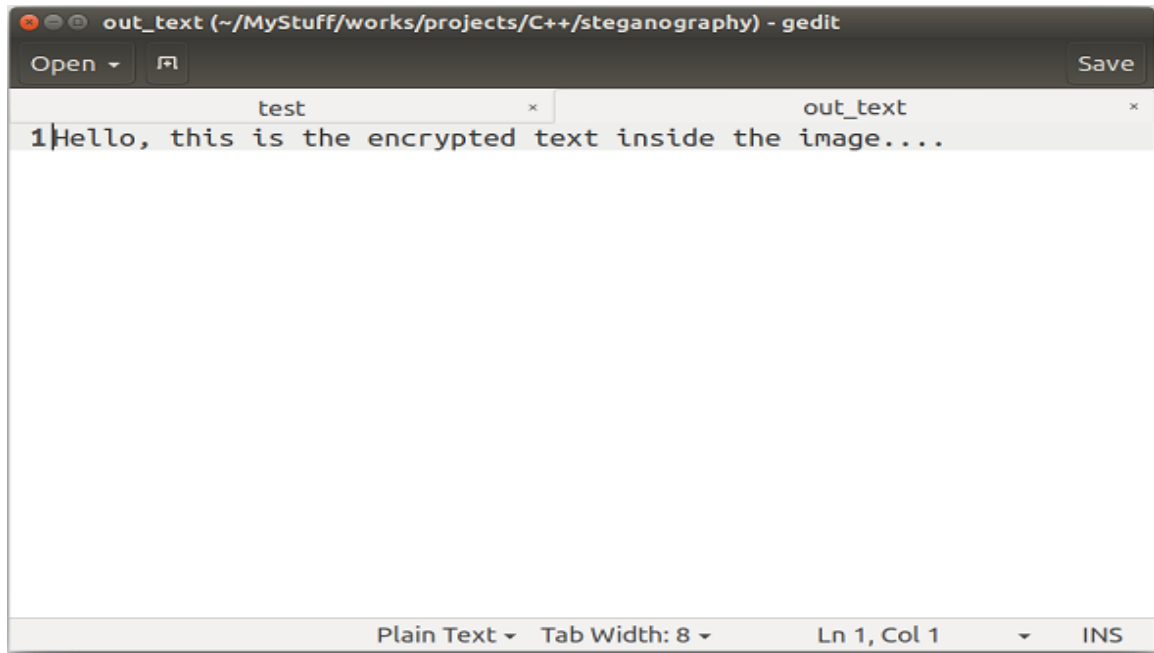
```
ameypc@linux: ~/MyStuff/works/projects/C++/steganography
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ ./steg -f test -o crypted.png mi_wall.jpg
:: Set a password: demopass123
:: Stego-image saved as 'crypted.png'
ameypc@linux:~/MyStuff/works/projects/C++/steganography$
```

- Decrypt command with text encrypted image file 'crypted.png', extract text in output 'out_text' file. Next command shows encrypted text on the terminal without saving in any file. Both command requires password to decrypt the hidden text.



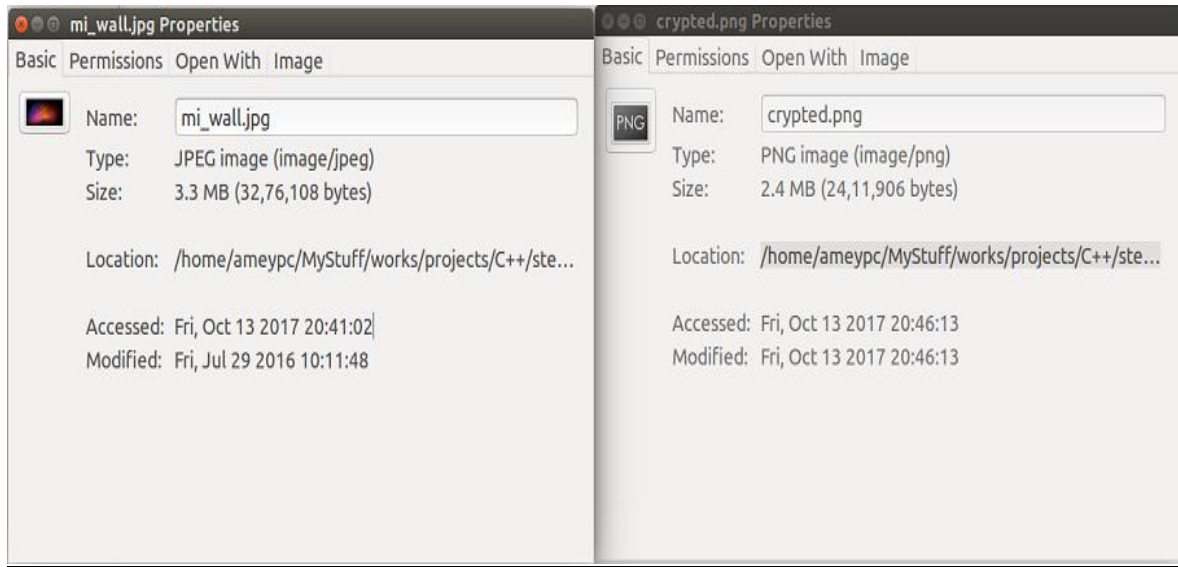
```
ameypc@linux: ~/MyStuff/works/projects/C++/steganography
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ ./unsteg crypted.png -o out_text
:: Password: demopass123
:: Hidden text extracted to 'out_text'
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ ./unsteg crypted.png
:: Password: demopass123
Hello, this is the encrypted text inside the image...
ameypc@linux:~/MyStuff/works/projects/C++/steganography$
```

- Decrypted text extracted in text file 'out_text'.



```
out_text (~/MyStuff/works/projects/C++/steganography) - gedit
Open  Save
test out_text
1Hello, this is the encrypted text inside the image....
Plain Text Tab Width: 8 Ln 1, Col 1 INS
```

- Comparison of original an encrypted image files.



- Clean all respective executable and object files at last.

```
ameypc@linux: ~/MyStuff/works/projects/C++/steganography
ameypc@linux:~/MyStuff/works/projects/C++/steganography$ make clean
Cleaning the executables
Cleaning the object files
ameypc@linux:~/MyStuff/works/projects/C++/steganography$
```

8.ADVANTAGES & LIMITATIONS

❖ ADVANTAGES:

- 1) Fast and easy way of to send secure stuff.
- 2) Easy process to encrypt text on image. Can be added on any image, so that it is like other image only.

❖ LIMITATIONS:

- 1) Password have to be shared which can be hacked and used.
- 2) Only text inside image can be encrypted and retrived.
- 3) Have to manually send the image to receiver.
- 4) No GUI present.

9.FUTURE ENHANCEMENT

- Encryption in multimedia (video, audio) such as hiding image inside image, image or text inside video or video inside video, document inside any multimedia or file.
- Graphical user interface can be provided.

10.BIBLIOGRAPHY

❖ **Sites:**

www.stackoverflow.com

www.geeksforgeeks.org

www.cplusplus.com

www.tutorialspoint.com

❖ **Books:**

C++ Primer Plus: Stephen Prata.