



## **Image Encryption and Decryption Under Visual Cryptography**

*Vedanshi Shethia<sup>\*1</sup>, Ansh Kuril<sup>\*2</sup>, Rohit Motwani<sup>\*3</sup>, Kuldeep Patil<sup>\*4</sup>, Pratibha Pedneker<sup>\*5</sup>*

<sup>\*1,2,3,4</sup>Student, Department of Computer Engineering, Vivekanand Education Society's Polytechnic, Chembur, Mumbai, Maharashtra, India

<sup>\*5</sup>Lecturer, Department of Computer Engineering, Vivekanand Education Society's Polytechnic, Chembur, Mumbai, Maharashtra, India

### **ABSTRACT**

In the form of text, audio, videos and photographs, the Internet is a commonly used tool to exchange details. The long-distance exchange of information on a wide network needs encryption to secure the information from unauthorized access. The reliability of the network plays an important role in protecting data on an insecure network. Many encryption solutions have been discovered to protect the data on the network, and recent creative encryption schemes have been in demand since e-commerce e-banking and multimedia technologies are viewed on a regular basis on the internet. Cryptographic coding methods have lately been used primarily to protect unauthorized access to knowledge on an insecure network. The researchers also established many cryptographic strategies for protecting and efficiently transmitting knowledge on an insecure network. Image encryption techniques are commonly used by all cryptographic techniques to transmit photos on an insecure network. The purpose of this paper is to demonstrate the few encryption techniques that are used on an insecure network to encrypt the image. To encrypt the image, this paper proposes a new encryption technique.

**Keywords:** Image encryption, Cryptography, Encryption algorithms, Image processing, Data security, steganography

### **1. INTRODUCTION**

Information security is the most common word uttered by any man, any device or any peripheral since the past two centuries. Protection from malicious sources has become a part of the invention or the discovery cycle. Myriad methods of protection are used ranging from a simple authentication password to most complex Cryptography Image encryption works on the innovative idea of taking the consecutive or random pixel bits of an image and collectively worked and modified with logic, thereby leading to a complete set of new of pixel, which is typical from the original bits Hence, giving rise to a new mode of information transfer. A further complication can be added to the malignant attacker, by incorporating the CBC (Cipher Block Chaining) method by which the plain text is monumentally embedded in the encrypted image, thereby making the data transfer very secure. A further addition of a key in the process makes the image tight/closed from any external agency. Sending raw images is not a good idea as many attackers are ready to steal the sensitive data to threaten people.

In the current trends, the technologies have been advanced. Most of the individuals prefer using the internet as the primary medium to transfer data from one end to another across the internet. There are many possible ways to transmit data using the internet like: via e-mails, sending text and images, etc.

In the present communication world, images are widely in use. However, one of the main problems with sending data over the Internet is the 'security' and authenticity. Image security is of utmost concern as web attacks have become more and more serious. Image encryption decryption has application in internet communication, multimedia systems, medical imaging, telemedicine, military communication.

### **2. LITERATURE SURVEY**

Information security is the most common word uttered by any man, any device or any peripheral since the past two centuries. Protection from malicious sources has become a part of the invention or the discovery cycle. Myriad methods of protection are used ranging from a simple authentication password to most complex Cryptography Image encryption works on the innovative idea of taking the consecutive or random pixel bits of an image and collectively worked and modified with logic, thereby leading to a complete set of new of pixel, which is typical from the original bits Hence, giving rise to a new mode of information transfer. A further complication can be added to the malignant attacker, by incorporating the CBC (Cipher Block Chaining) method by which the plain text is monumentally embedded in the encrypted image, thereby making the data transfer very secure. A further addition of a key in the process makes the image tight/closed from any external agency.

To summarize and brief in short, the program we are proposing is aimed at an intelligent auto generate planning system specific to the field of education. In the construction of an accurate and high-quality timetable there are barriers that need to be allowed namely access to classrooms, students, teachers, courses, time spaces etc. These are annoying factors that contribute to the challenges of similar production. Based on the uploaded information, the system will generate a class schedule automatically with customized configuration for each user. Encryption uses different algorithms to encrypt the data into

different forms. Cryptographic Algorithm uses a set of keys with the different characters for both encryption and decryption. By using a key the plain text is converted to the cipher text and decryption is done by converting back the plaintext from the cipher text. Cryptography is a process of transmitting and storing data in a form that is read only by authorized users. Cryptography is a science of protection of data by encoding it into unreadable form. It is a useful way of protecting the important sensitive information by using mathematical form algorithms for both encryption and decryption processes. The encryption and decryption process depend on the key value.

---

### 3. SYSTEM IMPLEMENTATION

#### A. EXPERIMENTAL SETUP

For this project, the programming language used is Python and is built from Py Tesseract libraries using Visual Studio Code. For the database, we have used PostgreSQL to store container details and item information. Their short information is noted below:

- **NumPy:** NumPy, the abbreviation for Numerical Python, is a Python Package. It consists of multi-dimensional array objects and a collection of routines for processing those arrays. Using NumPy, Mathematical and Logical Operations can be performed on arrays.
- **Pandas:** Pandas is a Python Package that provides fast, flexible, and expressive data structures which are designed to make working with “relational” or “labeled” data easy. It aims to be the building block for doing practical and real-world data analysis in Python. Its broader goal is to become the most powerful and flexible open-source data analysis/manipulation tool available in any language.
- **Opencv-Python:** cv2 is the module import name for opencv-python, "Unofficial pre-built CPU-only OpenCV packages for Python". The traditional OpenCV has many complicated steps involving building the module from scratch, which is unnecessary
- **Imutils:** Imutils are a series of functions that help us make basic image processing such as translation, resizing, rotating, skeletonization, and displaying Matplotlib images easier with OpenCV and both Python 2.7 and Python 3.
- **Tkinter:** The tk Message Box module is used to display message boxes in your applications. This module provides a number of functions that you can use to display an appropriate message.

#### B. PROJECT PROCEDURE AND FLOW

- We start by downloading and installing python on our laptops. We installed it with the following given configurations. We also installed VS-code on our laptop.
- Install Tkinter, PIL, numpy, cv2, os, random
- After that download the code file, and run image\_encryption\_decryption.py on the local system.
- Then the script will start running and the user can explore it by encrypting and decrypting any image and saving it.

#### C. BASIC FLOW OF THE APPLICATION

##### Algorithm:

Step 1: Start

Step 2: choose an image file

Step 3: Process the Image

Step 4: Image Encrypted

Step 5: Save the image

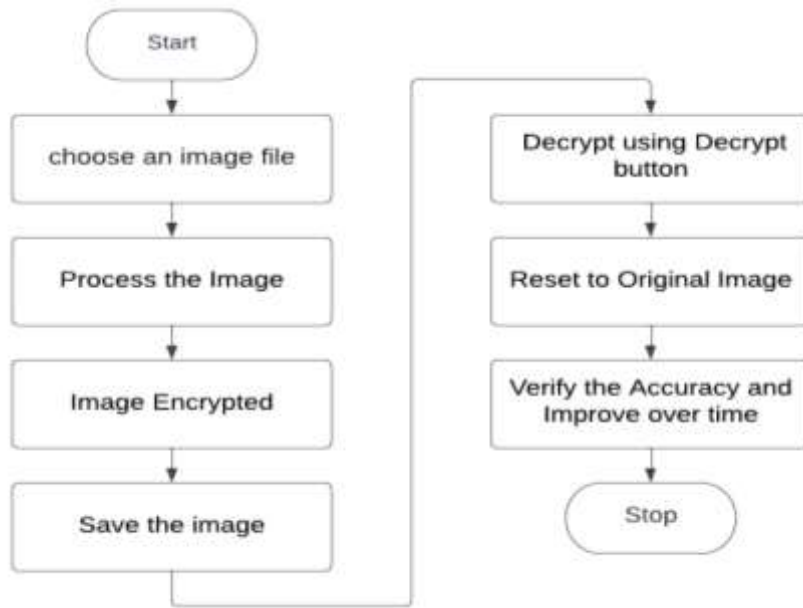
Step 6: Decrypt using Decrypt button

Step 7: Reset to Original Image

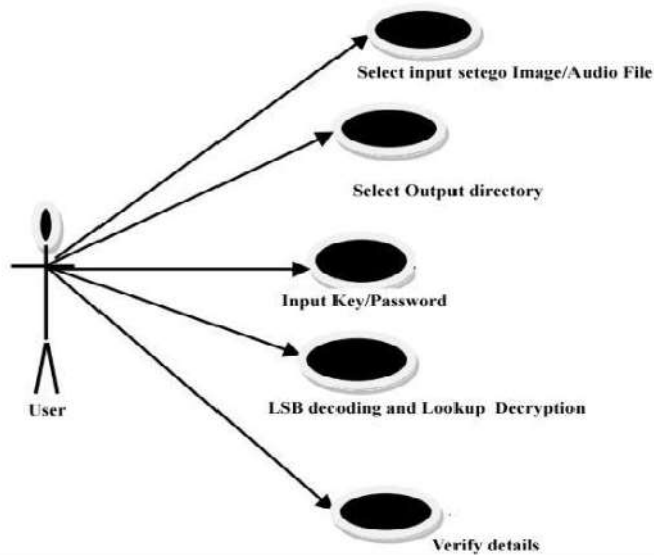
Step 8: Verify the Accuracy and Improve over time

Step 9: Stop

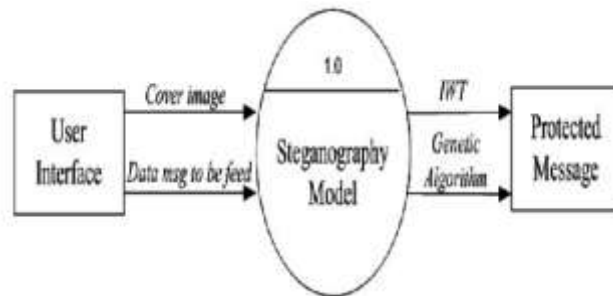
**Flowchart:**



**Use Case Diagram:**



**Data Flow Diagram:**



---

## ACHIEVEMENTS TO DATE

### Image Encryption:



### Image Decryption:



---

## FUTURE RESEARCH

Image encryption has applications in the corporate world, health care, military operations, and multimedia systems. Encryption is the process of encoding a plain text message into a cipher text message whereas the reverse process of transforming cipher text to plain text is called decryption. Image encryption has always been an important area of research and development, as it is essential for protecting the confidentiality and integrity of digital images. In the future, image encryption is likely to continue to evolve and become even more sophisticated to keep pace with advancements in technology and the increasing demand for secure communication and storage of digital images.

---

## CONCLUSION

In conclusion, image encryption is a critical area of research and development in the field of information security. As digital images become more ubiquitous in our lives, it is important to ensure that they are protected from unauthorized access and tampering.

---

In the future, image encryption is likely to continue to evolve and become even more sophisticated. Researchers are exploring a variety of new techniques, such as quantum image encryption, homomorphic encryption, multi-level encryption, deep learning-based encryption, and blockchain-based image encryption.

#### REFERENCES

---

- [1] <https://www.geeksforgeeks.org/encrypt-and-decrypt-image-using-python/>
- [2] <https://github.com/akash-rajak/Image-Encryption-Decryption>
- [3] [https://en.wikipedia.org/wiki/Visual\\_cryptography#:~:text=Visual%20cryptography%20is%20a%20cryptographic,who%20developed%20it%20in%201994.](https://en.wikipedia.org/wiki/Visual_cryptography#:~:text=Visual%20cryptography%20is%20a%20cryptographic,who%20developed%20it%20in%201994.)
- [4] <https://www.oreilly.com/library/view/image-encryption/9781466576995/>
- [5] <https://jivp-urasipjournals.springeropen.com/articles/10.1186/s13640-018-0386-3>