
CAPSTONE PROJECT

SECURE DATA HIDING IN IMAGE USING STEGANOGRAPHY

Presented By:

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OUTLINE

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PROBLEM STATEMENT

In today's digital age, the need for secure communication and data protection is paramount. Traditional encryption methods, while effective, are often easily detectable. There is a growing demand for techniques that ensure data confidentiality without raising suspicion. The objective of this project is to develop a secure method for hiding sensitive data within digital images using steganography, making the existence of the hidden data undetectable to unauthorized individuals.

TECHNOLOGY USED

- **Programming Language:** Python

- **Libraries:**

 - OpenCV library for image processing.

 - os library in Python provides a way to interact with the operating system.

 - string library provides useful tools for handling and manipulating strings.

- **Algorithms:**

 - Least Significant Bit (LSB) for embedding data into images.

 - Advanced Encryption Standard (AES) for data encryption before embedding.

- **Tools:**

 - Integrated Development Environment (IDE): PyCharm/Visual Studio Code/Spyder(Use in this project).

 - Version Control: GitHub.

WOW FACTORS

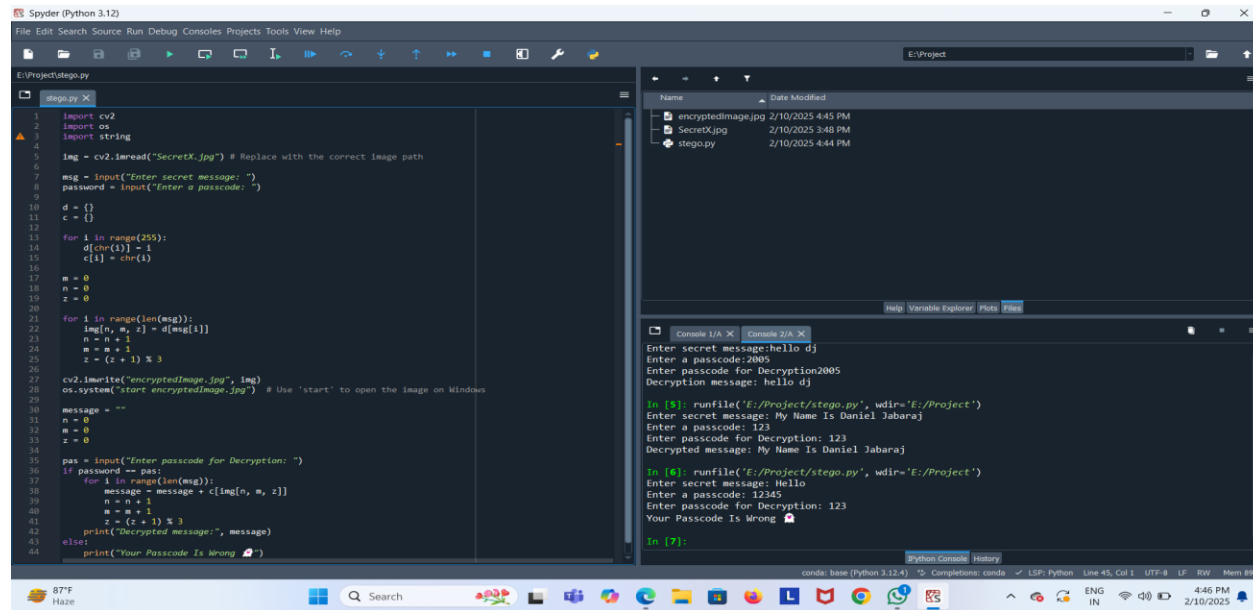
- **Invisibility:** The hidden data is imperceptible to the human eye, maintaining the visual integrity of the cover image.
- **Double Security:** Combines encryption and steganography, ensuring data remains secure even if detected.
- **Cross-Platform:** Compatible with multiple operating systems (Windows, macOS, Linux).

END USERS

This project targets individuals and organizations that require confidential communication, such as:

- Journalists working in hostile environments.
- Government agencies needing secure data exchange.
- Corporate sectors safeguarding trade secrets.
- Individuals concerned about personal privacy.

RESULTS



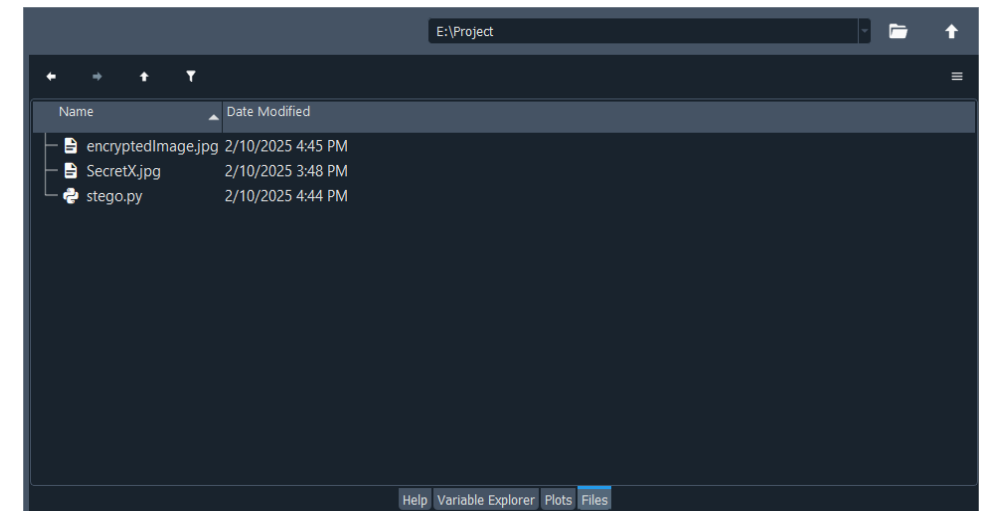
```
1 import cv2
2 import os
3 import string
4
5 img = cv2.imread("SecretX.jpg") # Replace with the correct image path
6
7 msg = input("Enter secret message: ")
8 password = input("Enter a password: ")
9
10 d = {}
11 c = {}
12
13 for i in range(255):
14     d[chr(i)] = i
15     c[i] = chr(i)
16
17 m = 0
18 n = 0
19 z = 0
20
21 for i in range(len(msg)):
22     img[n, m, z] = d[msg[i]]
23     n = n + 1
24     m = m + 1
25     z = (z + 1) % 3
26
27 cv2.imwrite("encryptedImage.jpg", img)
28 os.system("start encryptedImage.jpg") # Use 'start' to open the image on Windows
29
30 message = ""
31 n = 0
32 m = 0
33 z = 0
34
35 pas = input("Enter password for Decryption: ")
36 if password == pas:
37     for i in range(len(msg)):
38         message = message + c[img[n, m, z]]
39         n = n + 1
40         m = m + 1
41         z = (z + 1) % 3
42     print("Decrypted message:", message)
43 else:
44     print("Your Password Is Wrong 🚫")
```

Console Output:

```
In [5]: runfile('E:/Project/stego.py', wdir='E:/Project')
Enter secret message:hello dj
Enter a password:2005
Enter password for Decryption:2005
Decryption message: hello dj

In [6]: runfile('E:/Project/stego.py', wdir='E:/Project')
Enter secret message: My Name Is Daniel Jabaraj
Enter a password: 123
Enter password for Decryption: 123
Decrypted message: My Name Is Daniel Jabaraj

In [7]:
```



OUTPUT

```
Console 1/A X Console 2/A X
Enter secret message:hello dj
Enter a passcode:2005
Enter passcode for Decryption2005
Decryption message: hello dj

In [5]: runfile('E:/Project/stego.py', wdir='E:/Project')
Enter secret message: My Name Is Daniel Jabaraj
Enter a passcode: 123
Enter passcode for Decryption: 123
Decrypted message: My Name Is Daniel Jabaraj

In [6]: runfile('E:/Project/stego.py', wdir='E:/Project')
Enter secret message: Hello
Enter a passcode: 12345
Enter passcode for Decryption: 123
Your Passcode Is Wrong 🚫
```

```
Console 1/A X
Python 3.12.4 | packaged by Anaconda, Inc. | (main, Jun 18 2024, 15:03:56) [MSC v.1929 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 8.25.0 -- An enhanced Interactive Python.

In [1]: runfile('E:/Project/Stegonography_Project.py', wdir='E:/Project')
Enter secret message: Hello Dj, this is X. nice to meet you, i will schedule a meet for you tomorrow
privately...
Enter a passcode: 2025
Enter passcode for Decryption: 2025
Decrypted message: Hello Dj, this is X. nice to meet you, i will schedule a meet for you tomorrow
privately...

In [2]: S|
```


ORIGINAL IMAGE & ENCRYPTED IMAGE



CONCLUSION

- The "Secure Data Hiding in Images Using Steganography" project successfully addresses the need for covert data protection in the digital realm. By combining steganography with encryption, the project provides a robust solution for secure communication without arousing suspicion.

GITHUB LINK

- [Click to View Project in Github: Daniel-Cva/Cyber-Security-Project](#)

FUTURE SCOPE

- **Enhanced Algorithms:** Research and implement more advanced steganographic techniques to increase data capacity and security.
- **Integration with Cloud Storage:** Enable secure storage and retrieval of steganographic images in cloud services.
- **Real-Time Communication:** Develop real-time secure communication systems using steganography.
- **Mobile Application:** Create mobile applications to allow users to hide and retrieve data on-the-go.
- **Machine Learning:** Employ machine learning to detect and prevent unauthorized steganographic attempts.



THANK YOU