CAPSTONE PROJECT

SECURE DATA HIDING IN IMAGES USING STEGANOGRAPHY

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OUTLINE

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PROBLEM STATEMENT

- The need for secure communication has grown, especially for confidential data.
- This project aims to address the challenge of hiding sensitive information (e.g., messages) inside images, making it difficult to detect the hidden data.



TECHNOLOGY USED

- Libraries:
 - Python 3.x
 - OpenCV (cv2) for image processing
 - hashlib for password hashing
- Approach:
 - The message is hidden by modifying the pixel values of an image, using the least significant bit (LSB) technique.
 - A passcode is used to secure the message, stored in hashed format (MD5).



WOW FACTORS

Unique Features:

- Encryption with password protection.
- Secure passcode-based decryption mechanism.
- MD5 hashing for authentication.
- Seamless integration with image files.
- > Secure and lightweight method for covert communication.
- Real-time hiding and retrieval of secret messages without altering the appearance of the image.



END USERS

Individuals who require secure communication for personal or professional purposes.

 Organizations needing a secure way to transmit sensitive information without drawing attention.



RESULTS

Screenshots of the outcome

Encryption Phase

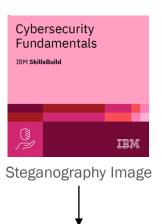


PS C:\Users\SACHI\Downloads\IBM CS Intern\Stenography-main\Stenography-main>python .\stego_encrypt.py
Enter secret message:hello Mr. ROBOT
Enter a passcode:pass123!



Steganography Image (no significant quality loss)

Decryption Phase



PS C:\Users\SACHI\Downloads\IBM CS Intern\Stenography-main\Stenography-main> & C:/Users/SACHI/AppData/Local/Microsoft/WindowsApps/python3.13.exe "c:/Users/SACHI/Downloads/IBM CS Intern/Stenography-main/Stenography-main/stego_decrypt.py"

Enter passcode for Decryption:pass123!
Secret Message: hello Mr. ROBOT

Decrypt the image and retrieve the secret message



CONCLUSION

The project successfully demonstrates how steganography can be used for secure data transmission, using image manipulation and encryption techniques. The solution is both effective and easy to implement.



GITHUB LINK

https://github.com/SachinMore/cs-steganography



FUTURE SCOPE(OPTIONAL)

Potential Improvements:

- Integration with advanced encryption algorithms to further secure the data.
- Extending the tool to support video or audio files for more robust steganographic techniques.
- > Using machine learning techniques to automatically detect and hide messages more efficiently.



THANK YOU

