
CAPSTONE PROJECT

SECURE DATA HIDING IMAGES USING STEGANOGRAPHY

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OUTLINE

- Problem Statement
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PROBLEM STATEMENT

This project explores the use of steganography to securely hide sensitive information within digital images. By using Python, we implement a system that conceals data without visibly altering the image.

TECHNOLOGY USED

- Programming Language : Python
- Libraries : PIL (Pillow), NumPy, Opencv
- Tools : Python IDLE

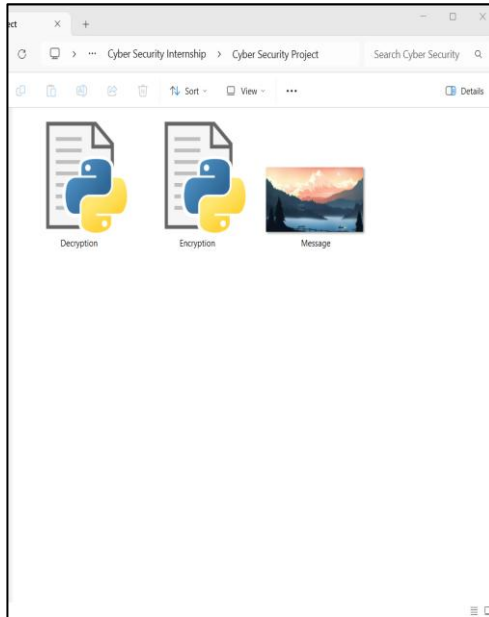
WOW FACTORS

- Invisible Security: The hidden data is undetectable to the human eye, preserving the image's original look.
- Lightning-Fast Processing: The project encodes and decodes messages within seconds, even for larger images.
- Plug & Play GUI: No need for technical expertise — users can easily hide and reveal messages with a simple click.
- Multi-Format Support: Works seamlessly with various image types like PNG, JPG, and BMP.
- Layered Security Potential: Can combine with encryption for an extra layer of protection.
- Lightweight & Portable: The application is small and easy to run on any system without heavy installations.
- Real-World Applicability: Perfect for confidential communications, watermarking, or secure file transfers.
- Customizable Design: The code structure is flexible, making it easy to add new features or enhance security.

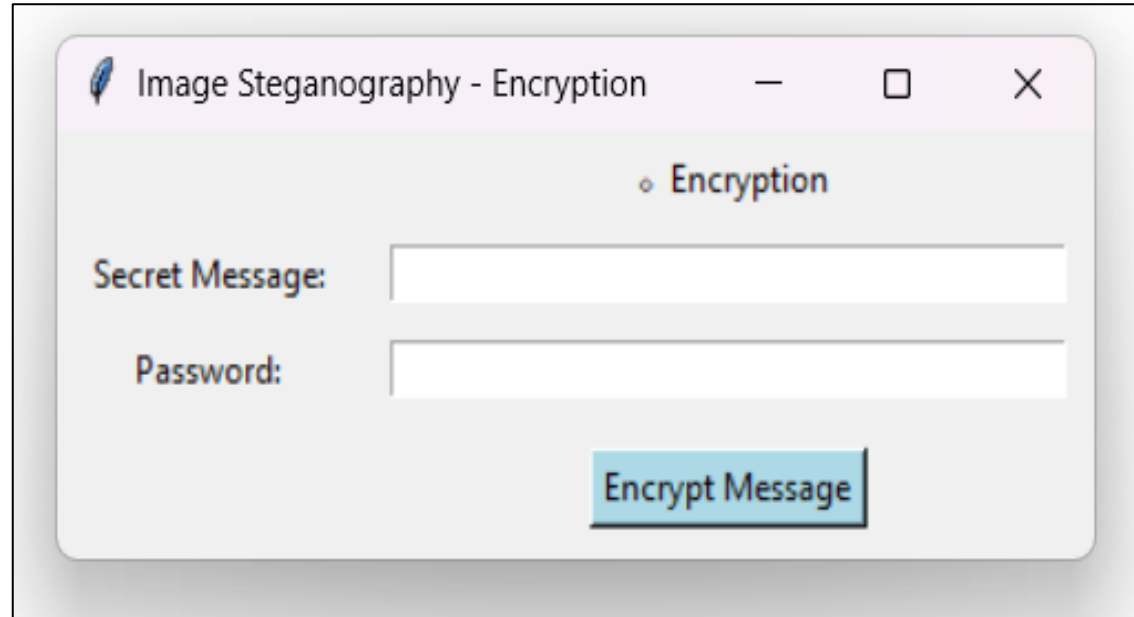
END USERS

- Cybersecurity Professionals: For secure communication and covert data transfers.
- Journalists & Whistleblowers: To share sensitive information without detection.
- Digital Forensics Experts: For embedding hidden markers or metadata in images.
- Content Creators & Artists: To watermark and protect intellectual property.
- Researchers & Academics: For secure information sharing in research materials.
- Military & Government Agencies: For confidential and covert operations.
- General Users & Privacy Enthusiasts: People seeking personal data privacy.

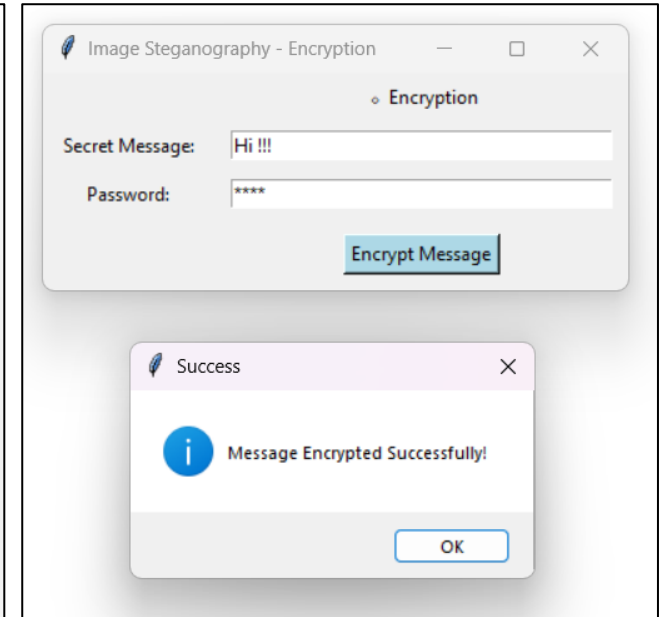
RESULTS



1.

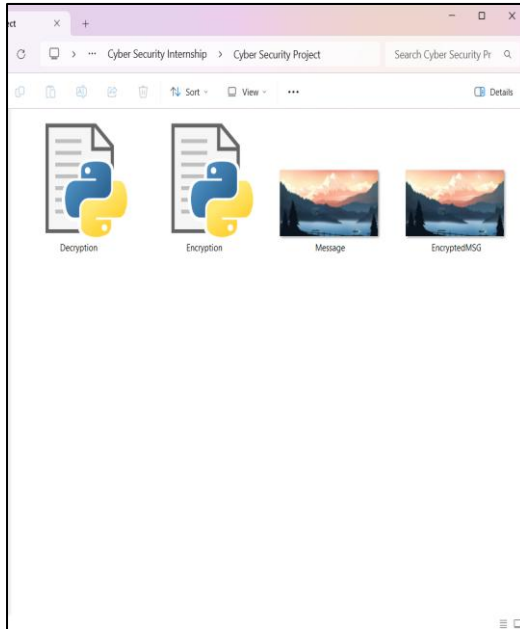


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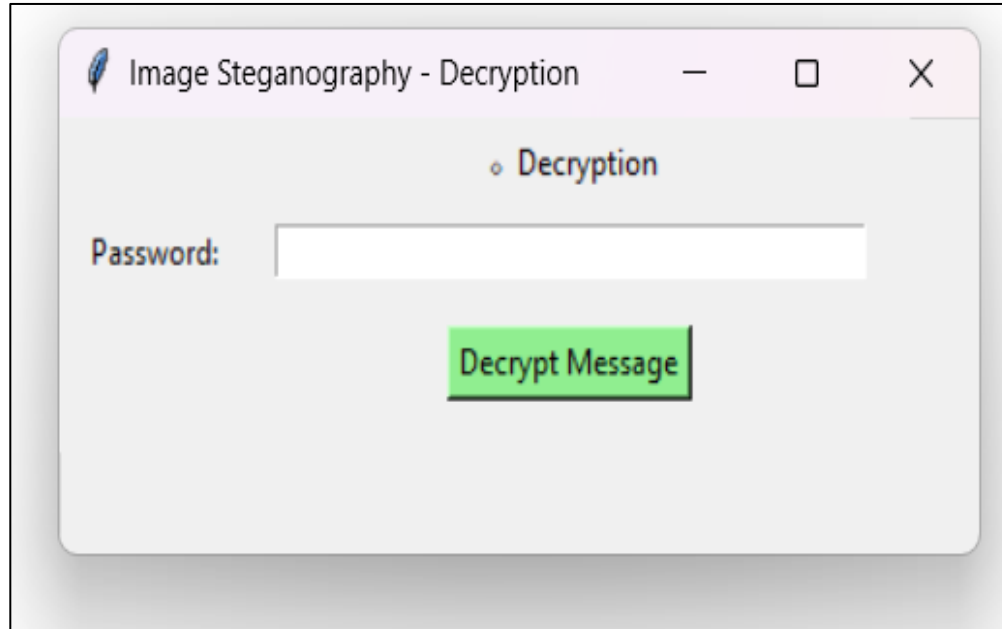


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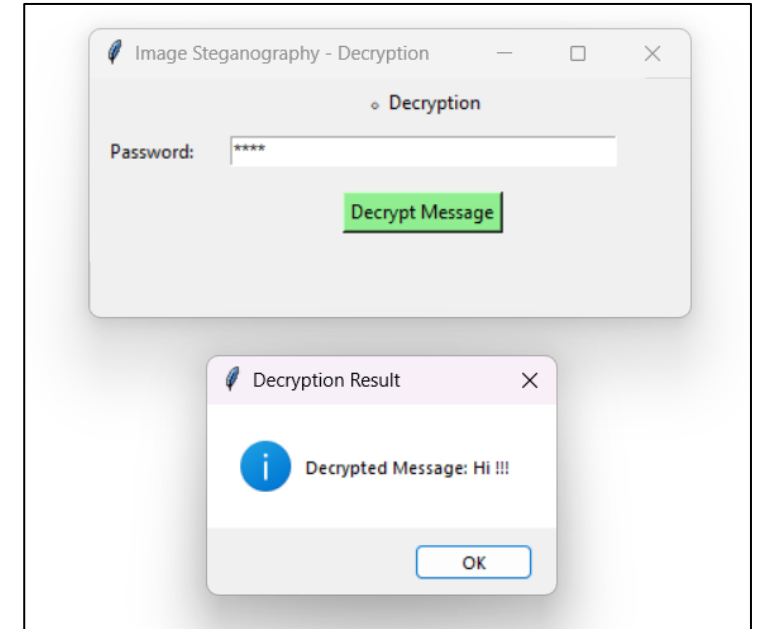
RESULTS



4



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CONCLUSION

This project addresses the growing need for secure data transmission by leveraging image steganography as a discreet alternative to traditional encryption. By embedding sensitive information within image pixels using Python, we provide a simple yet powerful tool that balances security and usability. This approach enhances confidentiality, making it a valuable solution for secure communication in an increasingly digital world.

FUTURE SCOPE(OPTIONAL)

- Support for Other Media Types: Expand the project to hide data in audio and video files.
- Advanced Encryption Integration: Add encryption algorithms for an extra layer of security before embedding.
- Steganalysis Resistance: Develop techniques to make hidden data even harder to detect through forensic analysis.
- Cloud & Web-Based Implementation: Build a web app or cloud service for remote, platform-independent usage.
- Image Compression Compatibility: Optimize the algorithm to work with compressed images without data loss.



THANK YOU