SECURE DATA HIDING IN IMAGE

Presented By : Janvi

AICTE INTERNSHIP PROJECT

OVERVIEW

- Abstract
- Problem Statement
- Technology Used
- WOW Factor
- End Users
- Implementation
- Github Link
- Result
- Conclusion
- Future Scope
- Thank You

ABSTRACT

In an era where sensitive data transmission over untrusted channels faces escalating risks, traditional encryption methods alone are increasingly vulnerable to sophisticated attacks. This project proposes a hybrid security framework that integrates Advanced Encryption Standard (AES) for robust data encryption and Least Significant Bit (LSB) steganography for covert data concealment within digital images.

PROBLEM STATEMENT

- Steganography provides a way to hide data within images, making it undetectable.
- This project addresses secure data hiding using AES encryption and LSB steganography.

First Problem

Sensitive data needs secure transmission over untrusted channels.

Second Problem

Traditional encryption methods are vulnerable to attacks.

TECHNOLOGY USED

Libraries :

- OpenCV (cv2) - image processing.
- Crypto - AES encryption.
- Hashlib - password hashing.
- numpy - numerical operations.

Platforms :

- Python programming language.
- Streamlit for building the user interface.

WOW FACTORS

1. Combines AES encryption with LSB steganography for enhanced security.
2. Password-based authentication ensures only authorized users can decode the message.
3. Real-time encoding and decoding via a user-friendly Streamlit app
4. Supports PNG images for lossless data embedding.
5. Secure and undetectable data hiding, making it ideal for sensitive applications.

END USERS

- **Individuals :**

  For securely sharing private information (e.g., passwords, documents).

- **Organizations :**

  For confidential communication and data protection.

END USERS

- **Government Agencies :**

  For secure transmission of classified information.

- **Researchers :**

  For experimenting with advanced steganography techniques.

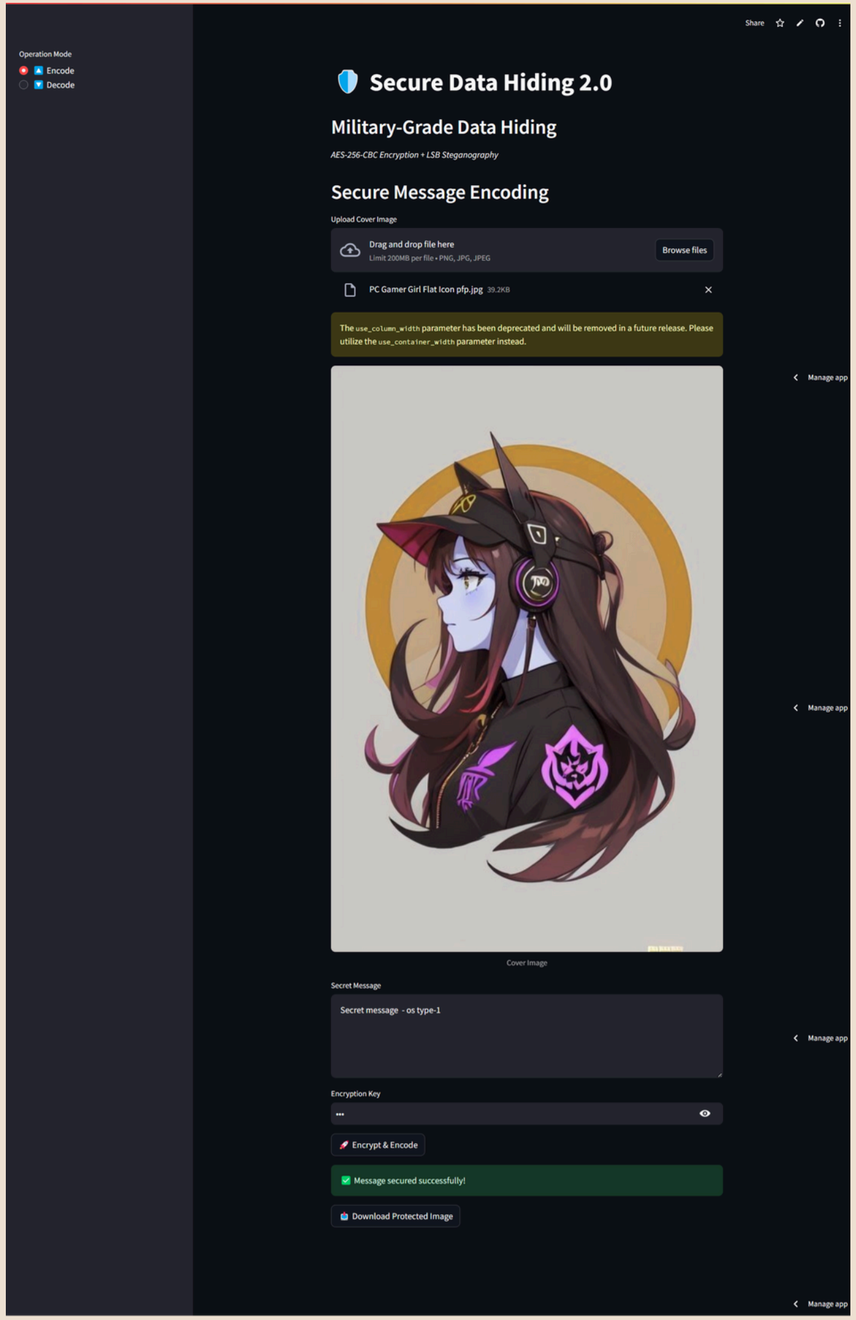
IMPLEMENTATION

● Features:

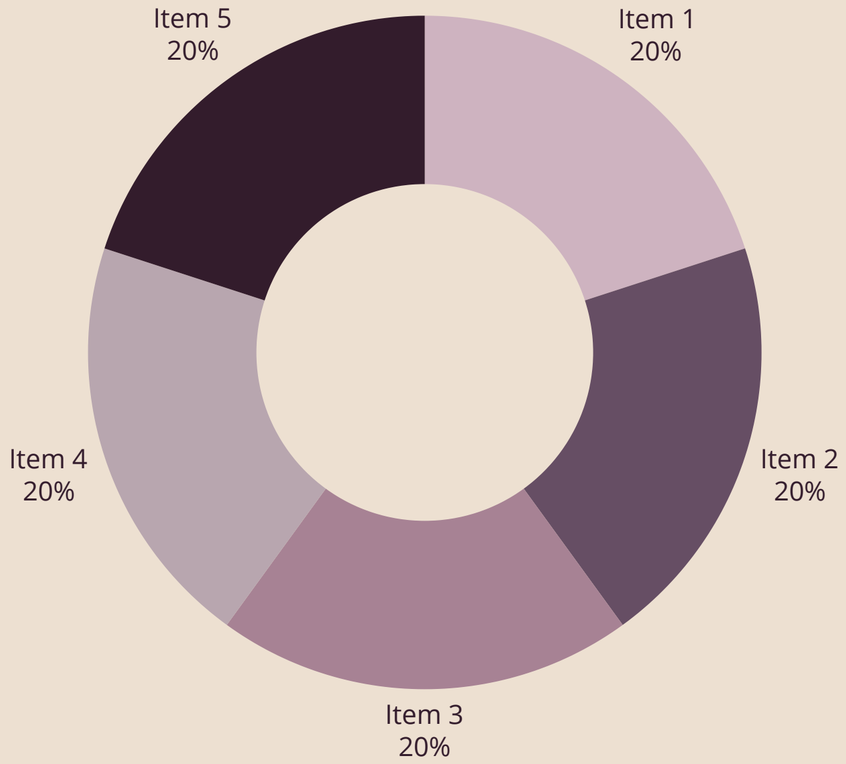
- Military-grade AES-256-CBC encryption
- Secure key derivation with PBKDF2
- Automatic message length detection
- Support for multiple image formats
- Detailed error reporting
- Visual feedback for all operations
- Proper memory management
- Tamper detection
- Size validation

● Implementation provides:

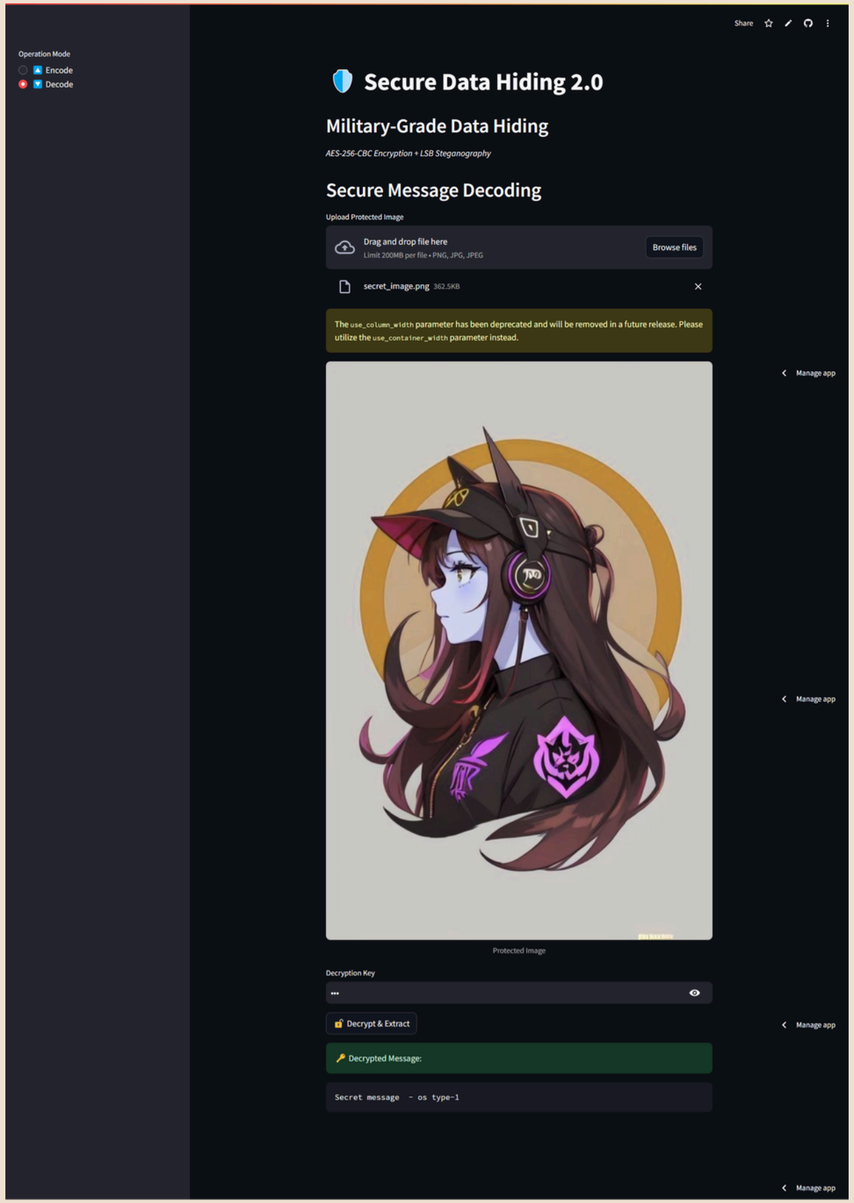
- Better security through proper cryptographic practices
- More reliable data embedding/extraction
- Improved user experience
- Better error handling
- Cross-platform compatibility
- Proper handling of different image types
- Defense against common steganalysis techniques



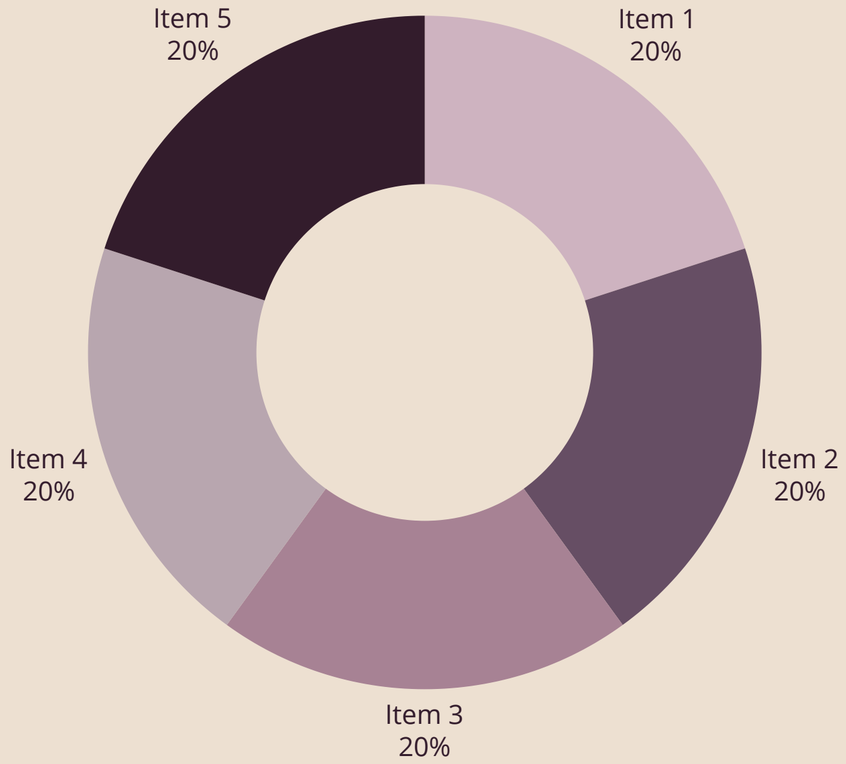
RESULT



AICTE INTERNSHIP PROJECT


Share
Operation Mode
Encode
Decode
Secure Data Hiding 2.0
Military-Grade Data Hiding
AES-256-CBC Encryption + LSB Steganography
Secure Message Decoding
Upload Protected Image
Drag and drop file here
Limit 200MB per file • PNG, JPG, JPEG
Browse files
secret_image.png 362.5KB
The use_column_width parameter has been deprecated and will be removed in a future release. Please utilize the use_container_width parameter instead.
Manage app
Protected Image
Decryption Key
Decrypt & Extract
Decrypted Message:
Secret message - os type-1

RESULT


Item 5
20%
Item 1
20%
Item 4
20%
Item 2
20%
Item 3
20%

GITHUB LINK

REPO LINK:

https://github.com/janvi100104/AICTE-Internship-Project

README LINK:

https://github.com/janvi100104/AICTE-Internship-Project/blob/main/README.md

LIVE PROJECT LINK:

https://aicte-internship-project.streamlit.app/

CONCLUSION

- The project successfully implements secure data hiding in images using AES encryption and LSB steganography .
- It addresses the problem of secure data transmission by combining encryption and steganography.
- The solution is robust, user-friendly, and suitable for real-world applications.
- Future enhancements can include support for additional file formats and improved error handling.

FUTURE SCOPE

- Extend support to other image formats like JPEG and BMP.
- Implement multi-layer encryption for added security.
- Develop a mobile application for on-the-go secure data hiding.
- Explore AI-based steganalysis detection to test the robustness of the system.

AICTE INTERNSHIP PROJECT

THANK YOU

Presented By : Janvi