

Visual Cryptography & Secret Secret Message Sharing

MENTOR : NABANITA DAS MA'AM

GROUP MEMBERS

- SAMIR ROY (20203024)
- SUBHRANIL MONDAL (20203027)
- ARNAB PATRA (20203030)
- SATYAPRIYA MONDAL (20203036)
- AVIRAJ KUMAR (20203063)
- SRISTI MITRA (20203067)

**University Institute of
Technology, Burdwan**

Information Technology

PROJ-IT 891
[Group-4]

Contents

1

Introduction

2

Image Steganography

3

Previous Work

4

Implementation

5

Future Improvements

6

References

7

Q & A

8

Thank You

Introduction

1

Motivation

To explore and enhance data hiding techniques to improve security.

2

Cryptography vs. Steganography

Cryptography encrypts data to prevent unauthorized access. Steganography hides data within other files to conceal its existence.

3

Idea

Combining visual cryptography with image steganography to secure and conceal info.

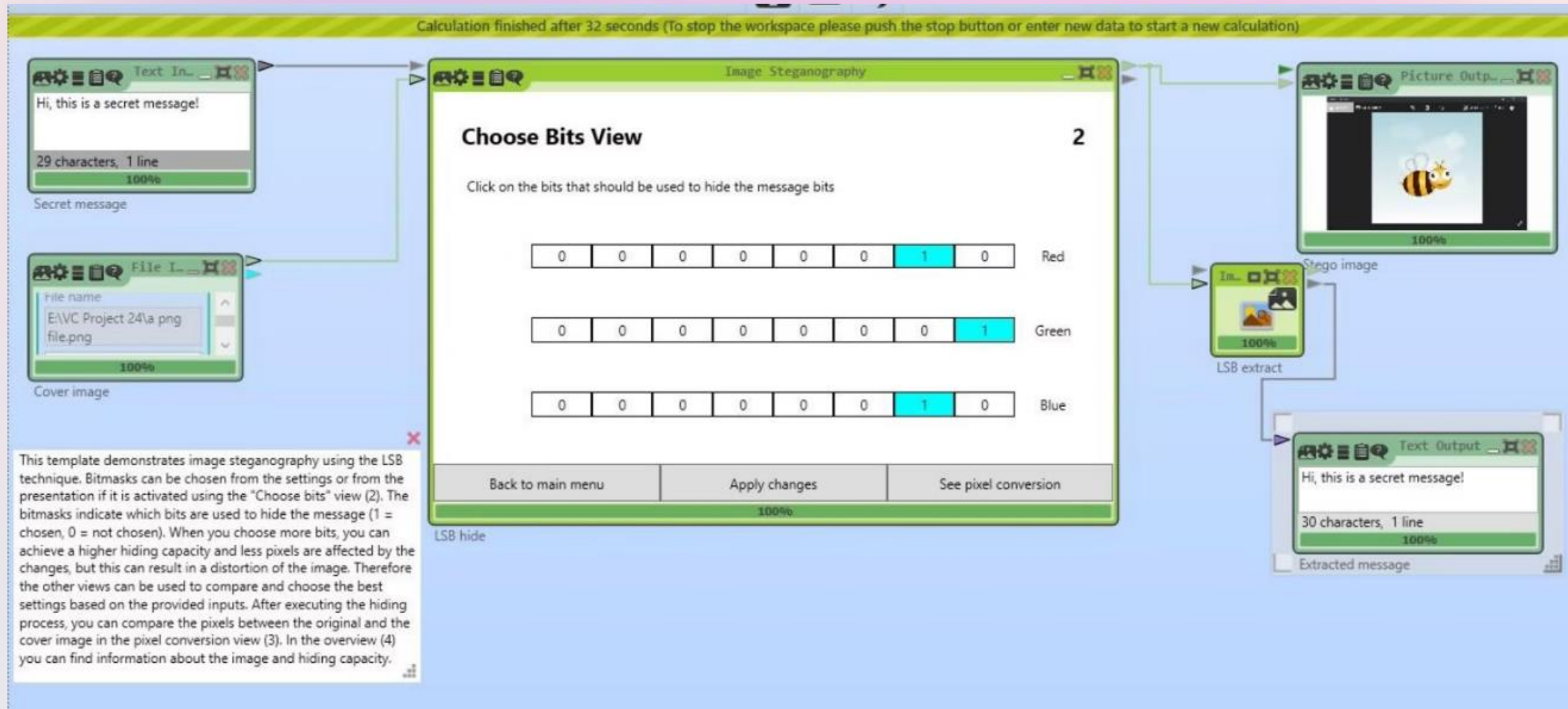
4

Outcome

Improved security and concealment of data through innovative techniques.

Image Steganography

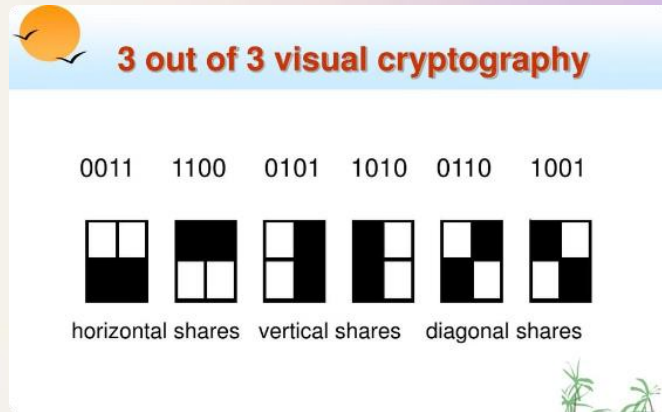
Image steganography involves hiding data within digital images.



Techniques: LSB (Least Significant Bit) method, masking, filtering, and transformations.

Examples: Hiding text or images within other images by altering the least significant bits.

Previous Work



Share Generation

Dividing an image into multiple shares using visual cryptography.



Survey Reports

Research of VC methods, Naor and Samir, Kinger's EVC, Binary AOHs, Ross and Othman.

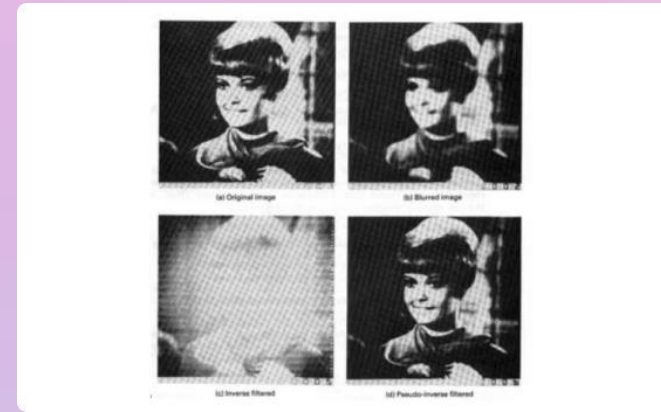


Image Restoration

Techniques to retrieve and restore hidden data from steganographic images.



Previous Drawback

Limited capacity and detectability of hidden data.

Implementation



Image and Message Message Input

- User provides image.
- User provides message(secret code).



Encryption Process

- Image convert in grey scale.
- Generate multiple shared images.



Decryption Process

- Each pixel combines by XOR operation.
- Using Overlapping method reconstruct image and hide message.



Output Visualization

- Displays the reconstructed image.
- Display secret message.

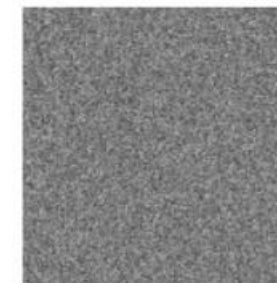
```
Enter the number of shares: 5
Enter the message to hide in the shares: UIT BU
5 shares generated successfully with embedded message: 'UIT BU'.
```

Input → Encryption → Decryption → Output

```
Reconstructed image saved as 'constructed.png'.
Hidden Message: UIT BU
```



Original image



Share Patch



Reconstructed image

Real Life Scenarios

1

Intelligence Agencies

Transmit confidential info securely via hidden messages in images.

2

Corporate Data Protection

Safeguard sensitive business info by embedding it in shared images.

3

Digital Watermarking

Protect creative works with invisible ownership proof in images.

4

Personal Privacy

Share private messages in personal photos for secure communication.

5

Journalism & Whistleblowing

Embed critical info in images to protect sources and content.

6

Medical Data Security

Securely transmit patient data by embedding it in medical images.

7

Anti-Counterfeiting

Embed identifiers in product images to verify authenticity.

8

Educational Institutions

Protect sensitive data by embedding it in shared documents.

Future Improvements

1. Optimize algorithms to embed larger messages without affecting image quality.
2. Reconstruct original image with fewer shares.



References

- Naor, M., & Shamir, A.(1995).Visual Cryptography.Advances in Cryptology— EUROCRYPT '94,1–12 10.Kinger,S.(2013).
- Efficient Visual Cryptography using Random Grids. International Journal of Computer Applications, 74(21),1-5. 11.
- Image Steganography Based on Hamming Code and Edge Detection- The International Arab Journal of Information Technology 15(5) 12. Zhou L, Xiao Y, Pan Z, Cao Y and Chen W (2022)
- Visual Cryptography Using Binary Amplitude-Only Holograms. doi: 10.3389/fphot.2021.821304.
- IEEE Transactions on Information Forensics and Security (Volume: 6, Issue:1, March 2011)
- Visual Cryptography and Secret Image Sharing [BOOK] (EDITED BY STELVIO CIMATO, CHING-NUNG YANG)
- Hide your secret messages in an Image! (Like the Cicada 3301) - Tech Raj YT.
- https://www.youtube.com/watch?v=U2EK_gzAlh0&t=514s
- CrypTool 2.1 (Stable Build 9778.2)



Q&A

Ask us anything. We're here to help with any questions you might have. Whether it's about the presentation, the technology behind it, or anything else, feel free to ask. We'll do our best to provide clear and helpful answers.

Thank You