CAPSTONE PROJECT

PROJECT TITLE

SECURE-DATA-HIDING-IN-IMAGE-USING-STEGANOGRAPH

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OUTLINE

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PROBLEM STATEMENT

In the digital era, **data security** is a critical concern. Traditional encryption techniques make data secure but are often **easily detectable**. **Steganography** is a powerful technique that allows **hiding secret messages inside images** without altering their visible appearance. The goal of this project is to implement **Least Significant Bit (LSB) steganography** with a **Graphical User Interface (GUI)** to make the encoding and decoding process **user-friendly**.

TECHNOLOGY USED

- **Programming Language**: Python 🐍
- **GUI Framework**: Tkinter 🎨
- **Image Processing**: OpenCV 📷
- **Data Encoding**: Least Significant Bit (LSB) Steganography 🔐
- **File Handling**: NumPy for efficient pixel operations

WOW FACTORS

✅ **User-Friendly GUI** – Simple and interactive design for encoding and decoding messages.

✅ **Secure Passcode Protection** – Ensures that only authorized users can retrieve the hidden message.

✅ **Supports Multiple Image Formats** – Works with PNG, JPG, and JPEG images.

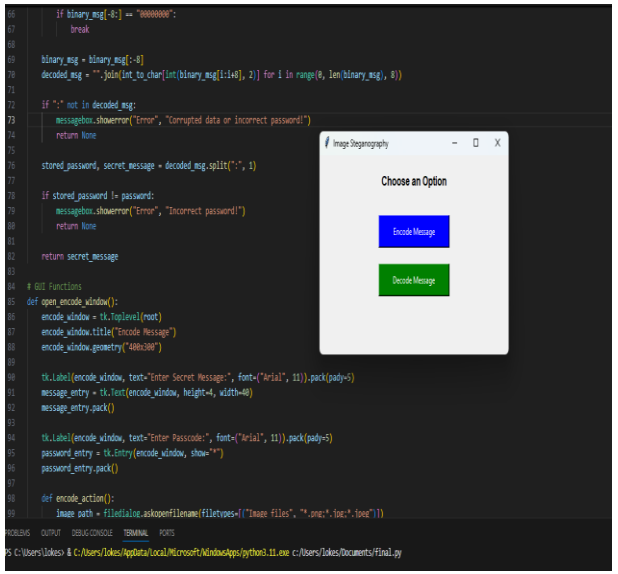
✅ **End Marker Implementation** – Prevents data corruption by marking the end of the hidden message.

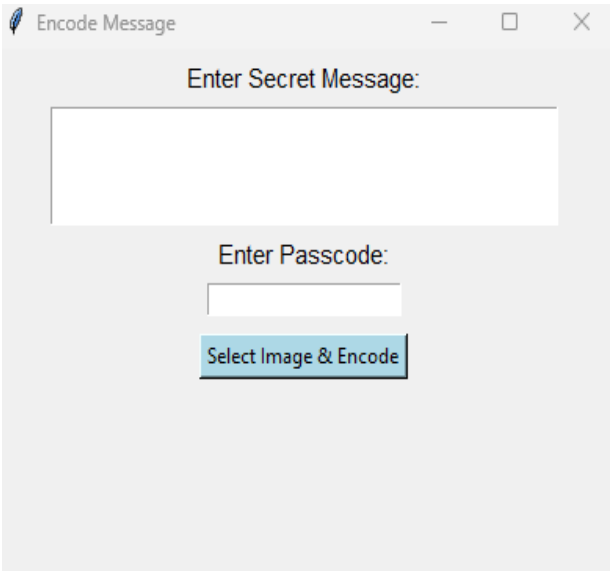
✅ **Error Handling & Validation** – Ensures smooth execution without crashes.

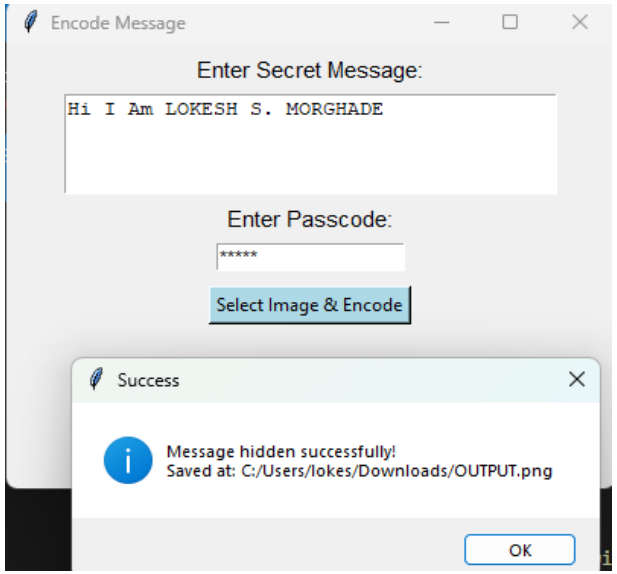
END USERS

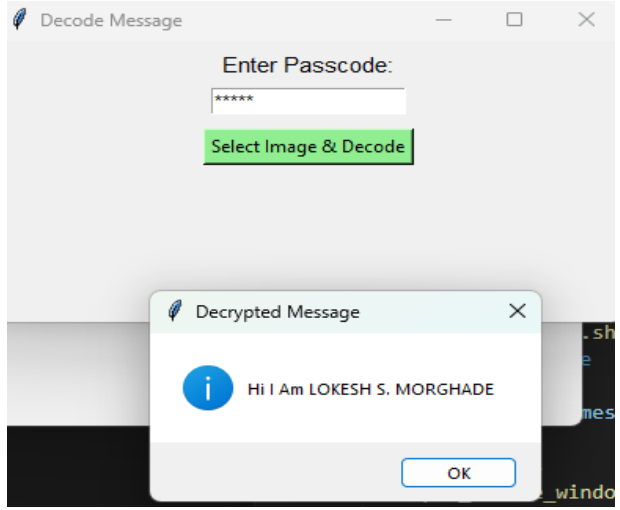
- **Journalists & Whistleblowers** – Hide sensitive information within images to prevent detection.
- **Cybersecurity Enthusiasts** – Learn and experiment with data hiding techniques.
- **Government & Intelligence Agencies** – Secure communication of confidential messages.
- **General Users** – Protect personal information by embedding messages in images.

RESULTS









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CONCLUSION

This project demonstrates how **steganography** can be used as a **secure method** of communication by embedding messages into images without significant distortion. The **GUI-based approach** makes it accessible to a broader audience, ensuring that even users with minimal technical knowledge can use the tool effectively.

GITHUB LINK

https://github.com/lokeshmorghade/Secure-Data-Hiding-in-Image-Using-Steganograph.git

FUTURE SCOPE(OPTIONAL)

- **Support for Video Steganography** – Expand from images to video frames for better data hiding.
- **Advanced Encryption Techniques** – Add AES or RSA encryption before encoding for enhanced security.
- **Mobile & Web Application** – Develop Android/iOS and web-based versions for wider accessibility.
- **Steganalysis Detection Prevention** – Implement countermeasures to evade steganalysis tools.
- **Cloud Integration** – Securely upload and process images via cloud platforms.

THANK YOU