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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

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**Domain/Area :** Computer Science & Cybersecurity

# **Title of the Project :** Data Hiding Using Steganography

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**Aim:**

To develop a secure and user-friendly web application using image-based steganography that allows users to hide confidential messages within images, ensuring safe and invisible data transmission.

**Introduction:**

In today's digital age, secure communication is a top priority. Traditional encryption methods, while effective, can be vulnerable to detection and attacks. This project proposes an innovative solution using image-based steganography, where secret messages are hidden within images, making them undetectable to the human eye.

**Existing System:**

Currently, when people want to keep their data secure, they mostly rely on encryption techniques like **AES, DES, or RSA**. These methods effectively scramble the data so that only authorized users can read it. However, the problem is that encrypted data is **easily recognizable**—even though attackers may not understand the content, they know that **something is hidden**, making it a potential target.

**Problems with the Existing System:**

1. **Obvious Encryption** – Encrypted files look suspicious, making them more likely to be intercepted.
2. **Vulnerable to Attacks** – While encryption is strong, techniques like **brute force** and **cryptanalysis** can sometimes break it.
3. **Lack of Concealment** – Traditional encryption focuses on securing the message, but it doesn’t hide the fact that the message exists.
4. **Extra Storage Overhead** – Encrypted files often require more space, making them harder to share efficiently.

**Proposed System:**

To solve these problems, this project introduces **Image-Based Steganography**, where secret messages are hidden inside image files. Unlike encryption, which scrambles text but still makes it obvious that data is being protected, steganography **completely hides the presence of the message**, making it look like a normal image.

**Why This Approach?**

1. **Invisibility** – The message is embedded inside an image in a way that doesn’t change its appearance, so no one suspects it contains hidden data.
2. **Extra Security with Password Protection** – Even if someone extracts the hidden data, they **still need the correct password** to decode the message.
3. **Minimal Image Distortion** – The image remains visually unchanged, preventing detection.
4. **Safe & Easy Sharing** – Since the modified image looks normal, you can send it via email or social media without raising suspicion.
5. **Simple & User-Friendly** – This system provides a **Flask-based web interface**, allowing users to encrypt and decrypt messages easily without any technical knowledge.

**Abstract:**

Steganography is the practice of hiding information within another medium in a way that conceals the very existence of the hidden content. In the digital age, image files are commonly used as cover media to embed secret data such as text, files, or other images. Unlike cryptography, which secures the content of a message, steganography hides its existence, making it an effective tool for secure communication.

This project focuses on image-based steganography, where confidential data is embedded within images without perceptible changes to the human eye. With the rise of digital communication, the need for discreet data transfer methods has increased. By integrating steganography with robust algorithms, this project aims to enhance security against unauthorized access, detection, and potential attacks.

**Hardware Requirements:**

**Processor:** Intel core i5 (Minimum dual-core processor required)

**RAM:**16GB (Minimum 4GB or higher for better experience)

**Storage:**150GB Hard Disk Space (Minimum 60GB required)

**Development Tools:** Visual Studio

**Software Requirements:**

**Operating System:** Windows

**Code Editor:** VS Code

**Front end:** HTML5, CSS3

**Backend:** Python, frameworks used flask, OpenCV

**Head of the Department**  **Co-Ordinator** & **Guide**

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