Image Steganography

B.Tech CE Semester: VI
Subject: (CE-621) System Design Practice

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"Steganography is the science of a secret message, invisible to the naked eye, being transmitted through a medium." - Anonymous

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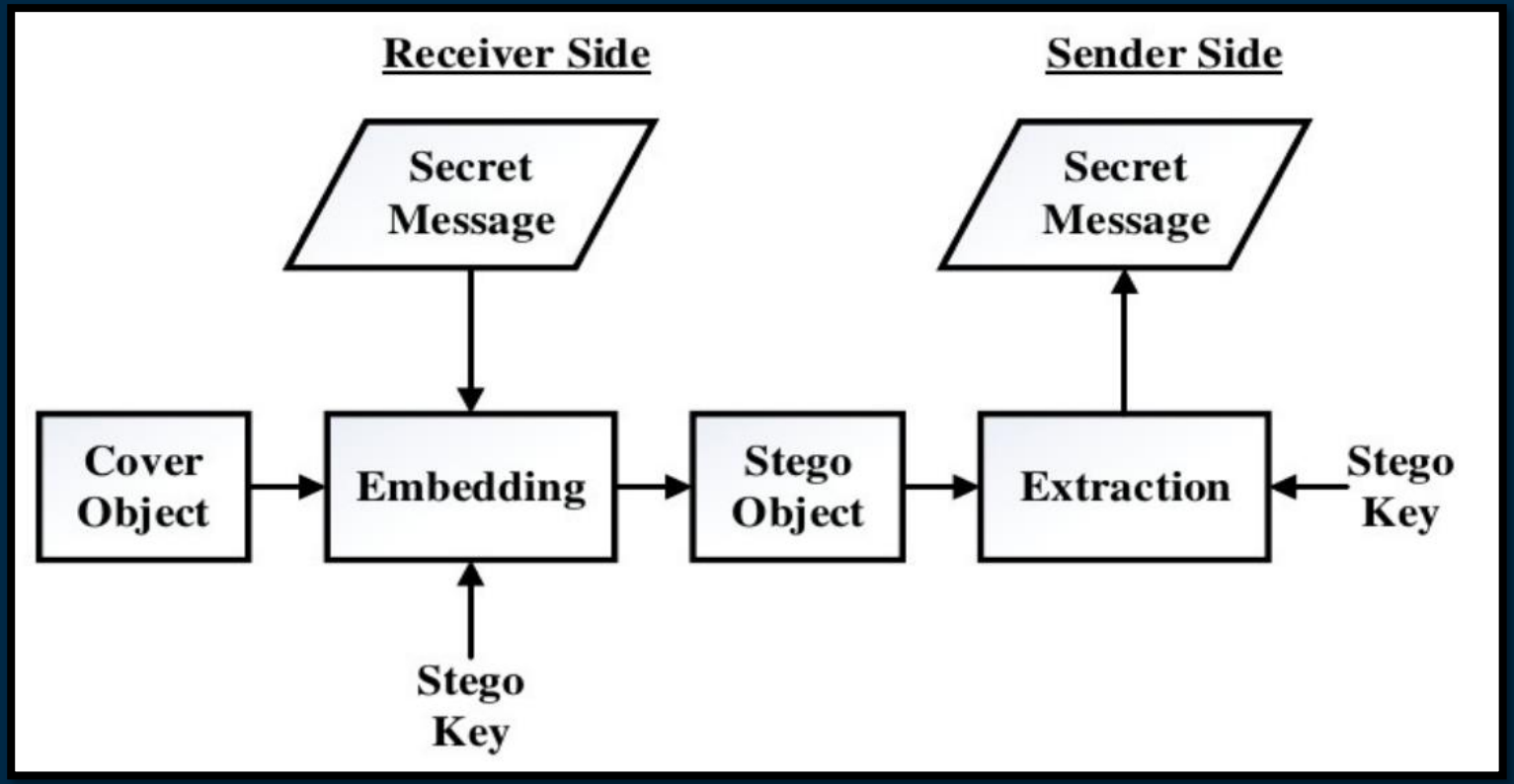
What is Steganography ?

- Art of hiding secret message in such a way that no one, apart from sender and intended recipient suspects existence of message.
- Steganography is a process that involves hiding important information (message) inside other carrier (cover) data to protect the message from unauthorized users.
- The art and science of concealing message in the form of text, image, video or file within another text, image, video or file is called steganography . (Not Cryptography)
- Two Approaches are available for Achieving Goal :-

1. Spatial Domain Based
2. Frequency Domain Based Ex – DCT , DFT , DWT

Basic Model of Steganography



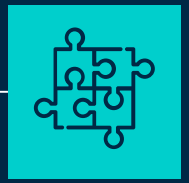
Classification of Steganography

- Based on **Carrier** : text, image, audio, video
- Based on **Message** format: text, image, audio, video
- Based on **Domain**: Spatial domain, Frequency domain
- Based on **Methods** used:
  - **Spatial Domain Methods** (LSB, Pseudo-random LSB Encoding),
  - **Frequency Domain Methods** (DCT, DFT, DWT)
  - Spread Spectrum Method, Statistical Method, Distortion Method, Visual Cryptography, Cover Generation Method

Applications of Steganography

1. Secret message is converted into a binary stream of bits.
2. Skin detection algorithm is applied on the cover in order to identify the skin areas as the regions of interest
3. The largest skin area is passes through DWT in order to extract its frequency coefficients.
4. An entropy based sub-band selection method is used in order to find the most textured sub-band and embedding positions are randomly selected using a seed.
5. The process of extracting the secret message from a particular ROI's particular sub-band and from particular positions

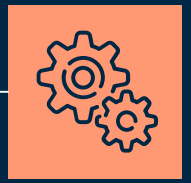
Performance Metrics



01

PSNR

A non-perceptual objective metric measuring the difference between the original and distorted images.



02

MSE

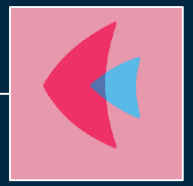
The cumulative squared error between the compressed and the original image

03

SSIM

Measurement or Prediction of image quality based on an initial uncompressed or distortion-free image as reference.

Technology



01

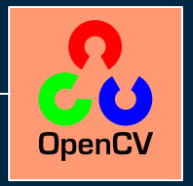
Flet.dev

Framework to quickly build interactive web, desktop and mobile apps in Python.

02

Python

High-level, general-purpose programming language.



03

OPENCV

A library of programming functions mainly for real-time computer vision.

Do you have any questions?

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THANKS