

STEGANOGRAPHY



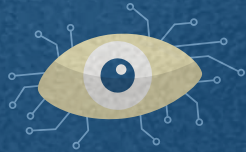
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INTRODUCTIONS



What is Steganography?

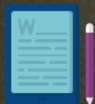


Steganography

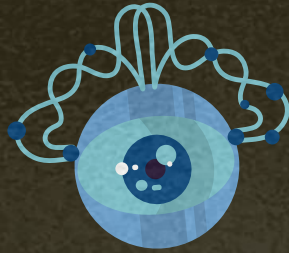
"Steganos" = hidden or covered



+

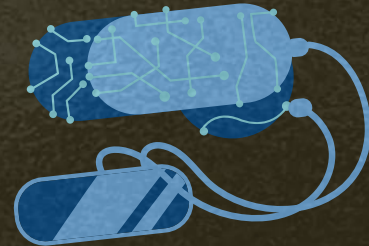


"Graph" = write



Steganography

- Steganography is simply hiding a message inside a file. It is a form of covert communication.
- Any environment can be used to hide messages.
- Steganography is not an encryption method.



A Brief History of Steganography

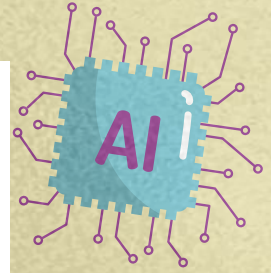
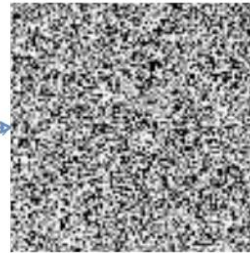
- ❑ Herodotus engraved the rebellion message he would send during the Persian attack on the head of one of his slaves.
- ❑ Wax tablets were widely used in ancient Greece.
- ❑ In the war between the French and the Germans, both sides provided messaging with invisible inks.
- ❑ During the Second World War, the Japanese national agent hid in New York in disguise.
- ❑ In A Beautiful Mind, it is seen that John Nash, a mathematician, searches for hidden messages in newspapers and magazines.



Steganography



Cryptography



STEGANOGRAPHY VS CRYPTOGRAPHY

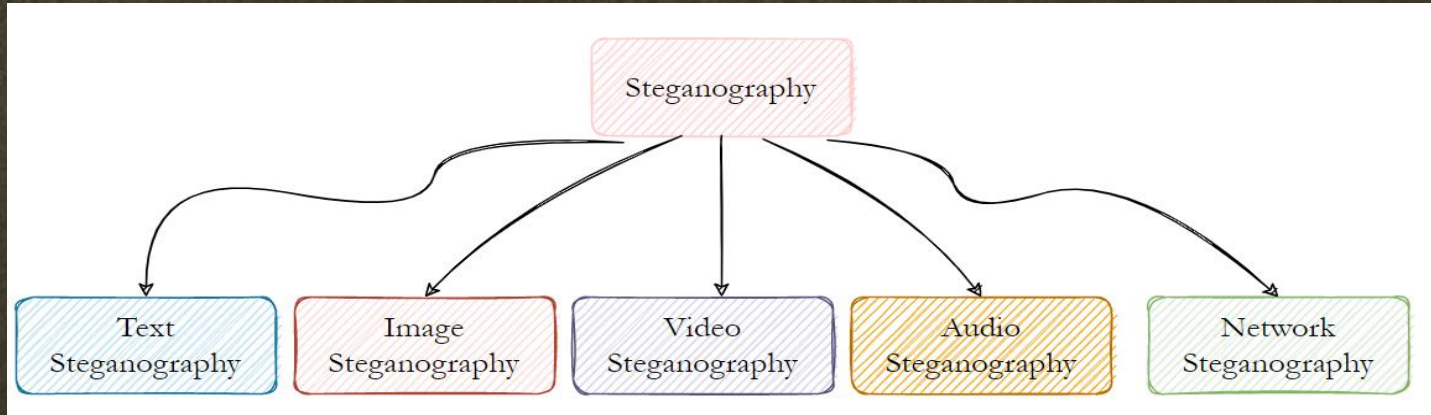


The image features a blue rectangular frame resembling a window. At the top, there is a dark blue title bar with three small white circles on the left. The background within the frame consists of a series of thin, dark blue lines that create a perspective effect, converging towards a central point on the horizon. The text "TYPES OF STEGANOGRAPHY" is centered in a bold, yellow, sans-serif font.

TYPES OF STEGANOGRAPHY

Types of Steganography

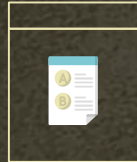
Steganography types are divided into five according to the environment in which the messages are hidden: Text Steganography, Image Steganography, Audio Steganography, Video Steganography and Network Steganography.



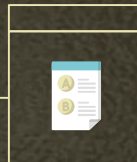
Text Steganography

Text Steganography

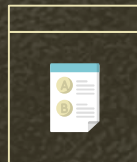
The method in which the message is hidden in a text is called text steganography.



Format Based Methods



Random and Statistical Generation

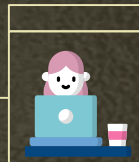
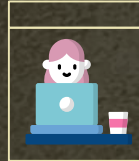


Linguistic Steganography

Image Steganography

Image Steganography

Image steganography is the hiding of a message such as text or sound inside the image.



Least Significant Bit

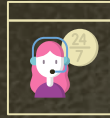
Masking and Filtering

Algorithms and Transformation

Audio Steganography

Audio Steganography

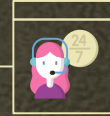
In the audio steganography method, the message is hidden in an audio signal.



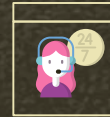
Least Significant Bit



Phase Coding



Spread Spectrum

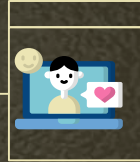
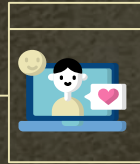


Echo Data Hiding

Video Steganography

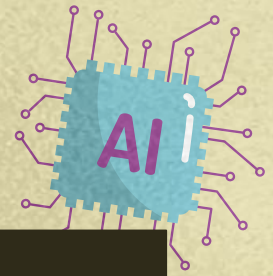
Video Steganography

In the video steganography method, the message is hidden in the videos.



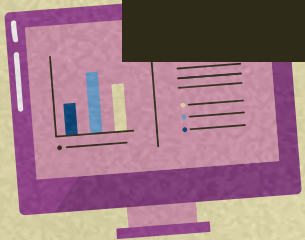
Embed the message in the uncompressed raw video.

Embed the direct message into the compressed video stream.

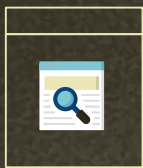


Areas

Where Steganography Is Used



Areas Where Steganography Is Used



Steganographic
Attacks

Agents

Games

Printers

STEGANALYSIS



Steganalysis

Steganalysis is used to detect the presence of a hidden message in a file.



Steganalysis

Visual Detection

It is called visual detection of some anomalies that occur as a result of data embedding in images.

Histogram Analysis

This method is based on the statistical analysis of the changing pixel value pairs as a result of data embedding in the image.

High-Order Statistical Analysis

In this method, in addition to the histogram analysis, statistical analysis of the positions of the pixels where the change takes place is also performed.

Steganalysis

Algorithm or Type-Specific Detections

It includes steganalysis methods developed specifically for image types with extensions such as JPEG.

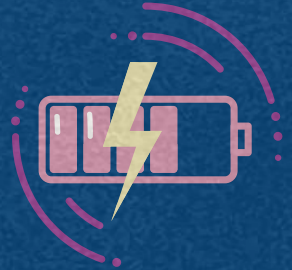
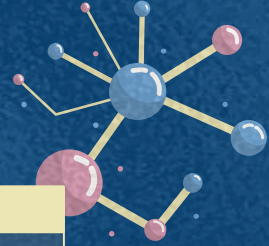
Universal Detection Systems

The features of the image are extracted and compared with the original image.

PROJECT



Methods Used In the Project



Project

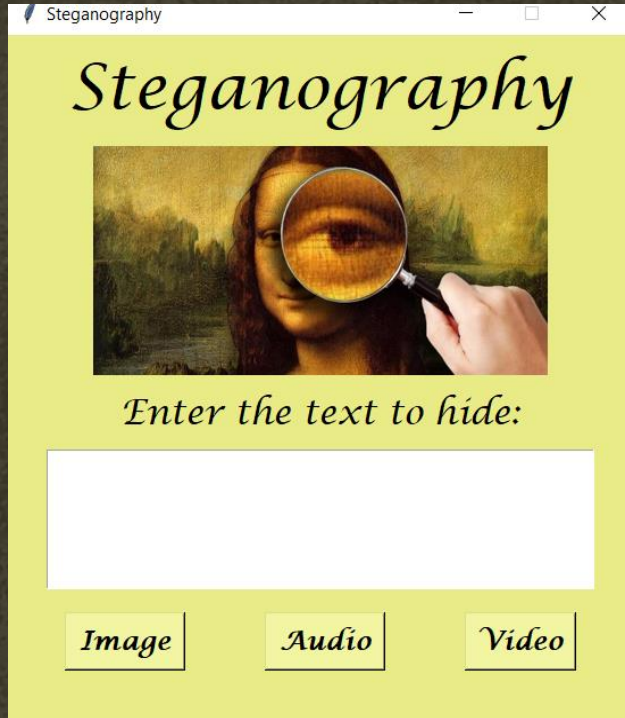
Methods

For STEGANOGRAPHY:

- Least Significant Bit

For CRYPTOGRAPHY:

- RSA



Project: Image Steganography

- In the scope of Image Steganography, all images are converted to RGB.
- The message to be hidden is encrypted with the RSA algorithm.
- The message is then sequentially embedded in the least significant bit within the three channels.
- In the decode operation, the reverse of the encode operation is applied.
- Letters are created by combining the values in the least significant bit by going to the 3 channels in the image sequentially.
- The generated letters are decrypted with the RSA algorithm and the message is revealed



Project: Audio Steganography

- The message to be hidden is encrypted with the RSA algorithm.
- The audio file is converted into frames. The frames in the audio file are converted to binary.
- Then, by applying the LSB technique to these binary values, the message is embedded by changing the least significant bit.
- For decoding process, the reverse of the encoding process is applied.
- Only .wav files are supported under Audio Steganography.



Project: Video Steganography

- Within the scope of Video Steganography, the audio is separated from the video and the video is divided into frames. Thus, since there are two different file types as sound and image, steganography techniques of these file types can be used.
- While video steganography is being performed, the message can be embedded in images if desired. Image steganography techniques are used to embed the message in images. Audio steganography techniques can also be used to embed the message in audio files.



DEMO



THANKS!

