

Study On Steganography Image

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Abstract

Image steganography is an important technique in the field of information security that focuses on concealing secret information within digital images without creating noticeable changes to the original image. This study examines the fundamental concepts, techniques, applications, and effectiveness of image steganography as a method of secure information communication. The study explores commonly used approaches, including spatial-domain techniques such as Least Significant Bit (LSB) substitution, as well as frequency-domain methods that utilize transformations to embed confidential data. Particular attention is given to the relationship between embedding capacity, image quality, security, and resistance to detection. The study also discusses the role of image characteristics and suitable algorithms in achieving an effective balance between data hiding and visual imperceptibility. Various evaluation measures, such as Mean Squared Error (MSE), Peak Signal-to-Noise Ratio (PSNR), and Structural Similarity Index (SSIM), can be used to assess the quality of steno-images after information embedding. The study further considers applications of image steganography in secure communication, digital watermarking, copyright protection, authentication, and confidential data transfer. Despite its advantages, challenges such as limited embedding capacity, steganalysis, computational complexity, and potential distortion remain significant concerns. The study concludes that image steganography can provide an additional layer of security when appropriately designed and combined with modern encryption techniques, offering considerable potential for secure digital communication and information protection.

Keywords: Image Steganography, Data Hiding, Information Security, LSB, Digital Images, Stego-Image, Steganalysis, Data Embedding, Digital Watermarking, Cryptography, PSNR,

SSIM.

