Research on building a secret information hiding algorithm and its application

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Abstract: This thesis investigates the development of a novel steganographic algorithm for secure data hiding and its practical application. Steganography, the art of concealing secret information within innocuous digital carriers, is crucial for ensuring covert communication and data security. The proposed algorithm focuses on enhancing both the imperceptibility and the embedding capacity of the hidden data. By analyzing the statistical characteristics of the cover medium, the algorithm dynamically selects optimal embedding positions, minimizing distortion and reducing the risk of detection by steganalysis tools. The study details the mathematical framework and implementation of the algorithm, followed by a comprehensive evaluation using standard metrics such as Peak Signal-to-Noise Ratio (PSNR) and payload capacity. Furthermore, the thesis demonstrates a specific application of the algorithm, such as embedding confidential text within digital images for secure transmission. Experimental results indicate that the proposed method achieves a favorable balance between robustness, capacity, and visual quality, offering a viable solution for real-world secure communication scenarios.

Keywords: secret information hiding, algorithm, construction, application