Techniques of Steganography

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***Abstract*—This thesis provides an in-depth overview of steganography techniques, focusing on embedding and extracting information in multimedia data, particularly images. The author explores the basic concepts, models, and applications of steganography, as well as the development of steganography algorithms in image compression. The work discusses non-robust and robust steganography techniques, and presents experimental results and evaluations of steganography methods, demonstrating their feasibility for secure data transmission and copyright protection in digital images. The author also describes the implementation of a steganography software for multimedia data, including modules for information embedding, steganography, and product usage registration. The experimental results show the transparency, compression ratio, and robustness of the steganography methods. The thesis concludes with ongoing research directions, including the application of steganography to video data and robust steganography techniques for audio data.**

***Index Terms*—steganography, image compression, data hiding, multimedia, digital watermarking**

I. Introduction

The thesis introduces the importance of steganography, its research objectives, and the scope of the study. It reviews the historical development of steganography and outlines the structure of the thesis. The introduction covers the basic concepts, models, and applications of steganography, as well as its implementation in multimedia data such as images, audio, and video. The author emphasizes the need for secure data transmission and copyright protection in digital media, highlighting the relevance of steganography in modern communication and information security. The study aims to explore various steganography techniques and their practical applications, providing a comprehensive overview of the field [1].

II. Methods

The methods section discusses the development of steganography algorithms for image compression, including non-robust and robust steganography techniques. The author presents experimental results and evaluations of steganography methods, focusing on the transparency, compression ratio, and robustness of the techniques. The implementation involves the use of software tools such as Borland Delphi 7 and Matlab 7, which are used to develop and test steganography algorithms. The author also describes the implementation of a steganography software for multimedia data, including modules for information embedding, steganography, and product usage registration. The experimental setup includes the use of various image files and data to evaluate the performance of the steganography methods [1].

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III. Results

The results section describes the implementation of a steganography software for multimedia data, including modules for information embedding, steganography, and product usage registration. The author reports on the experimental results, including the transparency, compression ratio, and robustness of the steganography methods. The transparency of the steganography methods is evaluated by measuring the visual impact on the host image, while the compression ratio is assessed by comparing the size of the original and stego images. The robustness of the methods is tested by subjecting the stego images to various attacks, such as compression, filtering, and noise addition. The experimental results demonstrate the feasibility of using steganography for secure data transmission and copyright protection in digital images [1].

IV. Discussion

The discussion section evaluates the steganography methods and their applications in secure data transmission and copyright protection. The author also mentions ongoing research on applying steganography to video data and robust steganography techniques for audio data. The discussion highlights the limitations of the current steganography methods, such as the trade-off between transparency and robustness, and the need for further research to improve the performance of steganography algorithms. The author suggests that future research should focus on developing more robust and transparent steganography techniques, as well as exploring new applications in multimedia data [1].

V. Conclusion

The conclusion summarizes the research findings, highlighting the feasibility of using steganography for secure data transmission and copyright protection in digital images. The author also indicates future research directions, including the application of steganography to video data and robust steganography techniques for audio data. The thesis concludes by emphasizing the importance of steganography in modern communication and information security, and the need for continued research to address the challenges and limitations of the field [1].

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