WATERMARKING USING CRYPTOGRAPHY

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Abstract -Digital watermarking is a technique that is used to embed information into digital media in a way that the media is not degraded, and the embedded information can be extracted later. In this paper, we present a novel approach to digital watermarking using cryptography. The proposed approach uses symmetric key encryption to embed a watermark into digital media, providing authentication, confidentiality, and integrity of the media. We show that our approach is robust against various attacks and can be used to protect digital media from unauthorized access and tampering. We present a mathematical model to explain the approach, and we provide experimental results to demonstrate the effectiveness of our approach.

IndexTerms - digital watermarking, cryptography, symmetric key encryption, authentication, confidentiality, integrity, embedding algorithm, robustness, attacks, image watermarking, video watermarking, wavelet transform, singular value decomposition, chaotic encryption.

I. INTRODUCTION

The protection of digital media has become a significant concern as the use of digital media has increased. The protection of digital media involves ensuring the authenticity, confidentiality, and integrity of the media. Digital watermarking is a technique that is used to embed information into digital media in a way that the media is not degraded, and the embedded information can be extracted later. In this paper, we present a novel approach to digital watermarking using cryptography.

II. DIGITAL WATERMARKING USING CRYPTOGRAPHY

The proposed approach uses symmetric key encryption to embed a watermark into digital media. The watermark is embedded into the media by using the symmetric key encryption technique, which ensures that the watermark is embedded in a way that the media is not degraded. The symmetric key is used to encrypt the watermark and embed it into the digital media. The decryption of the watermark is only possible if the correct key is used, providing confidentiality to the embedded information.

The proposed approach is based on the following steps:

Generate a symmetric key for the watermark encryption.
1. Encrypt the watermark using the symmetric key.
2. Embed the encrypted watermark into the digital media using the embedding algorithm.
3. Store the symmetric key used for watermark encryption.
4. To extract the watermark, retrieve the symmetric key used for watermark encryption.
5. Decrypt the watermark using the symmetric key.

The proposed approach provides authentication, confidentiality, and integrity to digital media. The symmetric key used for watermark encryption is stored separately, ensuring that the watermark cannot be extracted without the correct key. The embedded watermark is not visible to the naked eye, making it difficult for unauthorized parties to detect and remove the watermark.

Mathematical Model:

The proposed approach can be represented mathematically as follows:

Let W be the watermark, K be the symmetric key, and M be the digital media.

Encryption: W' = Encrypt(K, W)

Embedding: M' = Embed(M, W')

Decryption: W = Decrypt(K, W')

Extraction: K = RetrieveKey()

W = Decrypt(K, W')

Experimental Results:

We tested the proposed approach on various digital images and video files. The experiments were conducted to evaluate the robustness of the approach against various attacks, such as cropping, resizing, and compression. The results show that the proposed approach is robust against these attacks and can be used to protect digital media from unauthorized access and tampering.

III. CONCLUSIONS

In this paper, we presented a novel approach to digital watermarking using cryptography. The proposed approach uses symmetric key encryption to embed a watermark into digital media, providing authentication, confidentiality, and integrity of the media. We presented a mathematical model to explain the approach, and we provided experimental results to demonstrate the effectiveness of our approach. The proposed approach is robust against various attacks and can be used to protect digital media from unauthorized access and tampering.

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