Effective Watermarking of Digital Audio and Image using Matlab Technique

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Abstract— Watermarking is a technique which allows an individual to add hidden copyright notices or other verification messages to digital audio, video, or image signals and documents. In our proposal, for Audio Watermarking, a Watermark is encrypted using RSA Algorithm and is embedded on the audio file using LSB technique. LSB technique is an old technique which is not very robust against attacks. Here, in audio watermarking we have embedded the encrypted watermark on the audio file, due to which removal of the watermark becomes least probable. This would give the technique a very high robustness. In the retrieval, the embedded watermark is retrieved and then decrypted. This method combines the robustness of Transform domain and simplicity of spatial domain methods. For image Watermarking, DWT technique is used. DWT technique is used in Image watermarking. Here, we have embedded the watermark in the image as a pseudo-noise sequence. This gives a remarkable security to the image file as only if the exact watermark is known can the embedded watermark be removed from the watermarked image.

Keywords: Audio and Image watermarking, RSA algorithm, LSB and DWT technique

I. INTRODUCTION

Digital watermarking is a technology which allows a secret message to be hidden in a computer file, without the detection of the user. The watermark is not apparent to the user, and does not affect in any way, the use of the original file. Watermark information is predominantly used to identify the creator of a digital file, i.e. a picture, a song, or text. In digital watermarking an imperceptible signal "mark" is embedded into the host image, which uniquely identifies the ownership. After embedding the watermark, there should be no perceptual degradation. These watermarks should not be removable by unauthorized person and should be robust against intentional and unintentional attacks

II. AUDIO WATERMARKING

Digital audio watermarking involves the concealment of data within a discrete audio file. Applications for this technology are numerous. Intellectual property protection is currently the main driving force behind research in this area. To combat online music piracy, a digital watermark could be added to all recording prior to release, signifying not only the author of the work, but the user who has purchased a legitimate copy. RSA algorithm involves a public and private key. The public key can be known to everyone and is used for encrypting messages. Messages encrypted with the public key can only be decrypted using the private key.

A. Encryption using RSA algorithm

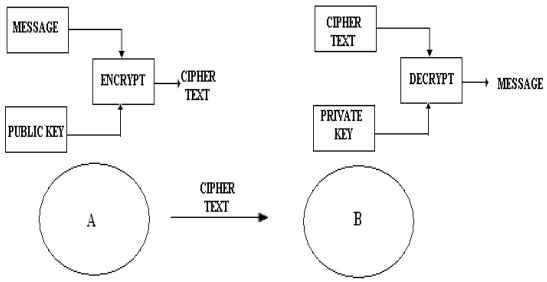

Fig 1: Encryption Using RSA algorithm

B. Algorithm

1. Find P and Q, two prime numbers.

2. Calculate N = P X Q.

3. Select E value such that it is not a factor of (P-1) X (Q-1).

Choose E such that E is greater than 1, E is less than N, also E and (P-1)(Q-1) are relatively prime, which means they have no prime factors in common. E does not have to be prime, but it must be odd. (P-1)(Q-1) can't be prime because it's an even number.

4. Select D such that (EXD) modulo (P-1)X(Q-1) = 1

Compute D such that (DE-1) is evenly divisible by(P-1)(Q-1). This is written as DE = 1 (mod (P-1)(Q-1)), and D is called the multiplicative inverse of E. That is find an integer X which causes D = (X(P-1)(Q-1)+1)/E to be an integer, then use that value of D.

5. The encryption function is C = (T^E) mod PQ, where C is the cipher text (a positive integer), T is the plaintext (a positive integer), and ^ indicates exponentiation. The message being encrypted, T must be less than the modulus, PQ.

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